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9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) ROCKY MOUNTAIN ARSENAL (CO.) COMMERCE CITY, CO		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
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12a. DISTRIBUTION / AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) THE PURPOSES OF THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC) IS TO PREVENT AND CONTROL THE DISCHARGE OF OIL AND HAZARDOUS SUBSTANCES AT RMA. THE SPCC PLAN IDENTIFIES POTENTIAL SOURCES OF OIL AND HAZARDOUS SUBSTANCES AND THE MEASURES REQUIRED TO PREVENT ACCIDENTAL DISCHARGE RESULTING FROM EQUIPMENT OR STORAGE FACILITY FAILURE. IN THE EVENT THAT A SPILL OCCURS, THE SPCC PLAN IDENTIFIED THE MEANS TO CONTROL, CONTAIN AND CLEANUP THE DISCHARGE. THE SPCC PLAN IS DIRECTED BY THE U.S. EPA REGULATIONS AND THE U.S. ARMY REGULATIONS. THE SPCC PLAN FOR RMA IS ORGANIZED AS FOLLOWS: 1. PROJECT BACKGROUND IS PROVIDED, 2. DETAILED DESCRIPTIONS OF THE INDIVIDUAL TANKS ARE PROVIDED, 3. THE INSTALLATION SPILL CONTINGENCY (ISC) PLAN IS PRESENTED, 4. THE SECURITY AT EACH OF THE TANK AREAS IS DISCUSSED, 5. A DESCRIPTION IS PROVIDED OF THE TYPES OF TRAINING PROCEDURES FOR RMA PERSONNEL, AND 6. REPORTING REQUIREMENTS ARE PRESENTED, INCLUDING THE REGULATORY AGENCIES WHICH NEED TO BE CONTACTED IF AN ACCIDENTAL SPILL OCCURS.			
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SUBJECT

Final Report - Spill Prevention Control and Countermeasures Plan

TO SMCRM-TO
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SMCRM-QA
SMCRM-ISF-E
SMCRM-ISF-B
SMCRM-ISF-F
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FROM SMCRM-ISF

DATE 1 August 1984

CMT 1

J. L. Green/mp/166

Rocky Mountain Arsenal
Information Center
Commerce City, Colorado

1. Enclosed is a Final Report - Spill Prevention Control and Countermeasures Plan. Request each addressee review the plan for concurrence and any major flaws. The plan is consistent with the requirement of the Army Regulation.
2. Any comments will be greatly appreciated so that, if there is any changes in this final report, they can be done during the update of RCRA Part B. Request all concurrence/comments be forwarded to this office by 24 August 1984.
3. POC is the undersigned.

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Encl
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James L. Green

JAMES L. GREEN
Facilities Engineer

SMCRM-TO (1 Aug 84)

TO Ch, Fac Eng Div

FROM Dir, Tech Ops

DATE 5 September 1984

CMT 2

Dr. McNeill/vi/164

1. Page 1-3. The statement that the SPCC plan complements the CAIC plan is not accurate. There is no provision to coordinate the two plans.
2. Pages 2-4 and 4-16 state that spilled materials can be disposed of in the sinks in Building 742. This should be avoided. The carbon and alumina treatment equipment in the South Plants waste water collection system is only designed to handle the very low concentrations of chemicals that may be discharged from the laboratories. The quantity of pesticide or decontamination chemical which might result from even a relatively small pesticide spill in Building 742 could rapidly overload the treatment system in Building 537, add chemical contaminants to the sanitary sewer in violation of the NPDES permit, and force shut-down of the laboratories.
3. Chapter 3 contains a detailed and useful description of tanks and potential spill sites. This could be made more useful with the addition of tab indices for quick reference and the inclusion of recommended containment, decontamination, and disposal procedures.
4. The response plan in Chapter 4 is unworkable in my opinion. There is no provision for command and control of operations in the field. Our experience over many years of simulated and actual CAIC operations is that command, control, and communication are by far the most important elements in obtaining effective response. In the subject plan, this area is

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ignored and any actual attempt to respond to a spill would come to a dead stop as soon as the response elements left their telephones and moved to the field. The on-scene coordinator would have no information from the site, would not know how to deploy resources, or be able to contact them. For spills of hazardous materials, downwind hazard and field monitoring must be considered. These have an important bearing on route of approach, field placement of response elements, and decisions concerning possible protection of off-post populations.

5. I have recommended to the Commander that there should be only one installation spill control plan, that it should continue to be the RMA Disaster Control Plan, Annex C, (CAIC Plan), and that any necessary additions or modifications be made to bring the existing plan into compliance with EPA regulations. This could be accomplished by appending to the CAIC plan the list of potential spill sites in the draft SPCC plan with additional information on special response procedures required for these sites and the materials stored there.

6. I have also recommended that Dr. Witt be assigned the CAICO responsibility in view of his background as an Army Chemical Officer and experience in CAIC field operations. This should be an interim assignment until the on-post surety materiel is demilitarized. The facility engineer should be an assistant CAICO until the surety program is completed, and then could be assigned as CAICO on-scene coordinator. A plan should be developed to train personnel in spill response who will be retained on the installation when realigned mission status is attained.

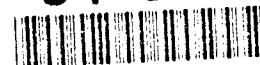
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~~Mr. Strang~~
Mr. Strang
Mr. Heim

W. McNeill
WILLIAM MCNEILL
Director
Technical Operations

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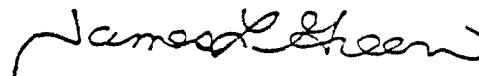
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1. Enclosed is a Final Report - Spill Prevention Control and Countermeasures Plan. Request each addressee review the plan for concurrence and any major flaws. The plan is consistent with the requirement of the Army Regulation.

2. Any comments will be greatly appreciated so that, if there is any changes in this final report, they can be done during the update of RCRA Part B. Request all concurrence/comments be forwarded to this office by 24 August 1984.

3. POC is the undersigned.



JAMES L. GREEN
Facilities Engineer

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as

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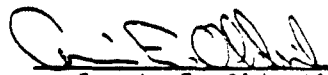
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CERTIFICATION

I, Corwin E. Oldweiler, a registered Professional Engineer in the State of Colorado, have reviewed, examined the facilities, and attest that the SPCC Plan prepared for Rocky Mountain Arsenal, dated July 1984, has been prepared in accordance with good engineering practices.

 7/16/84
Corwin E. Oldweiler, P.E.
Registration Number 15119
State of Colorado

1.0 INTRODUCTION

The purpose of the Spill Prevention Control and Countermeasure (SPCC) Plan is to prevent and control the discharge of oil and hazardous substances at Rocky Mountain Arsenal (RMA). The SPCC Plan identifies potential sources of oil and hazardous substances and the measures required to prevent an accidental discharge resulting from equipment or storage facility failure. In the event that a spill occurs, the SPCC Plan identifies the means to control, contain and cleanup the discharge.

Regulations were issued by the U.S. Environmental Protection Agency (EPA), as required by the Federal Water Pollution Control Act (FWPCA) amendments of 1972, to prevent discharges of oil into the navigable waters of the United States and to contain these discharges if they do occur. The SPCC Plan is directed by the U.S. EPA regulations, Title 40 CFR, Parts 112 and 1510, and U.S. Army Regulation (AR) 200-1, Chapter 8. These regulations require installations that have certain non-transportation related onshore and offshore oil storage facilities to prepare, maintain, and implement a SPCC Plan.

Army installations must prepare and implement a current SPCC Plan when their oil or hazardous substance storage facilities meet any one of the following criteria:

- o Aggregate aboveground oil storage, at any one location on the installation is greater than 1,320 gallons.
- o Any single aboveground oil storage tank at any one location on the installation is greater than 660 gallons.
- o Total underground oil storage at any one location on the installation is greater than 42,000 gallons.
- o Single bulk storage of hazardous liquid substances (acids, bases, chemical solvents, etc.)

is greater than 500 gallons. The 500 gallon limit represents the total combined quantity of hazardous liquid substance at a single storage location on an installation.

- o One or more hazardous substances stored in quantities that would present a threat to human health or the environment.
- o Non-transportation-related onshore and offshore facilities which because of their location on operations could reasonably be expected to discharge oil or hazardous material in harmful quantities into or upon the navigable waters of the United States.

For purposes of an SPCC Plan, the oil storage facilities include but are not limited to, storage for a facility such as heating or boiler plant, electric generating unit, fuel dispensing or transfer facility, tank car or truck loading/unloading rack, bulk fuel storage, etc.

Because RMA is a U.S. Army installation that stores petroleum products and hazardous substances in aboveground tanks in aggregate of greater than 1,320 gallons and singularly greater than 660 gallons, the SPCC Plan was developed. In addition, one or more hazardous substances are stored in quantities that could present a threat to the environment. A spill from RMA storage tanks also has the potential to discharge into navigable waters.

An Installation Spill Contingency (ISC) Plan was developed as a part of the SPCC Plan as required by AR 200-1, Section 3-9. The ISC Plan identifies the resources to be used to clean up any discharges of oil or hazardous substances at RMA. It also provides for assistance to non-defense agencies when requested. The ISC Plan establishes the responsibilities, duties, procedures, and resources to be employed, to contain and clean up accidental discharges. For RMA, the ISC Plan compliments the existing Chemical Accident and Incident Control (CAIC) Plan which covers chemical surety materials and the RCRA Part 3 Contingency Plan which covers hazardous wastes.

The SPCC Plan for Rocky Mountain Arsenal is organized as follows:

- o Project background information is provided in Chapter 2. The discussion includes a description of RMA, physical setting of RMA, specific tanks included in this SPCC Plan and the methodology used in preparing the Plan.
- o Detailed descriptions of the individual tanks included in this SPCC Plan are provided in Chapter 3. For each tank, the physical description, spill containment system, spill history, potential spills, inspection procedures and operating procedures and information, and deficiencies are discussed.
- o The Installation Spill Contingency (ISC) Plan is presented in Chapter 4. It is included to compliment the SPCC Plan, existing Chemical Accident and Incident Control (CAIC) Plan and RCRA Part B Contingency Plan. The discussion includes the fire prevention procedures utilized at RMA if an accidental spill occurs.
- o Chapter 5 presents a discussion of the security at each of the tank areas.
- o A description is provided in Chapter 6 of the types of training procedures for RMA personnel.
- o Chapter 7 presents reporting requirements. It includes a discussion of the regulatory agencies which need to be contacted if an accidental spill occurs.

IT Corporation was contracted by the U.S. Army Corps of Engineers in Huntsville, Alabama to prepare the SPCC Plan for Rocky Mountain Arsenal. RMA personnel identified the tanks to be included in the Plan. Specific information on the tank descriptions, inspection and operating procedures employed at RMA, and other pertinent RMA equipment and programs was obtained through a review of various existing reports and drawings and interviews with RMA personnel in Spring, 1983. Field work associated with the inspection of each tank was conducted initially in April, 1983 and updated in June, 1984.

2.0 PROJECT BACKGROUND

2.1 DESCRIPTION OF ROCKY MOUNTAIN ARSENAL

Rocky Mountain Arsenal (RMA) was established in 1942 by the Department of the Army as a defense installation for the purpose of producing toxic chemicals, and chemical-filled incendiary munitions for the armed services. At the end of the war, RMA was placed on a standby status. In 1946 certain portions of RMA were leased to other federal agencies and to private industry for the production of commercial products. Shell Chemical Company (SCC) was the major leasee, engaging in the manufacturing of various pesticides and herbicides.

RMA was reactivated as a defense installation just after the beginning of the Korean War for the purpose of producing incendiary and chemical munitions to meet supply requirements for the Army, Navy and Air Force. A major new facility was constructed during the period between 1951 and 1953 for the manufacturing of nerve agent GB and related munitions. After the Korean War, RMA underwent a series of significant changes in mission assignment. These changes resulted in RMA providing the following:

- o Pilot production, preproduction and limited production runs for various munitions.
- o Testing services and technical assistance to industry in the production of various munitions.
- o Research, development and engineering activities support to the higher command levels.

During the period 1959 through 1962, RMA was assigned responsibility for the production of a biological anti-drop agent. During the period 1963 through 1969, RMA's operations were primarily in support of military requirements in southeast Asia and included the manufacture and modification of various munitions.

In the early 1970's, RMA began demilitarization programs for various munitions including chemical agents and biological anti-crop agents. Demilitarization includes neutralization or incineration to render the munitions nonlethal. These demilitarization programs are still ongoing. In addition, the Department of the Army has undertaken a contamination control program to cleanup contaminated waste areas that have resulted from historical operations at RMA.

2.2 RMA PHYSICAL SETTING

2.1.1 Geographic Location, Size and Surrounding Area

RMA is located in Adams County, Colorado about ten miles northeast of the central business district of the City of Denver. RMA includes 17,238 acres and is bordered on the south by Denver's Stapleton International Airport, various business and warehouse districts including some city office buildings, and the residential subdivision of Montbello. The residential areas of Commerce City, Dupont, and Irondale adjoin the western boundary of RMA. Agricultural land with scattered residences is adjacent to RMA on the northwestern, northern, and eastern boundaries. One residential trailer park subdivision also adjoins the eastern boundary. A location map of RMA and the surrounding area as well as the topography is provided in Figure 1.

2.2.2 Climate

RMA has a mild, sunny, semiarid climate with an average annual precipitation of 16 inches. It has neither the extremely cold mornings of high elevations during the winter nor the hot afternoons of the lower elevations during the summer. Spring is generally the wettest, cloudiest and windiest season, with much of the precipitation falling as snow, which melts on mild sunny days and/or evaporates on the windier days. Precipitation during the summer months occurs as scattered rainshowers and evening thundershowers. Autumn and winter are generally the drier seasons. The climate of this region allows for potential evaporation and evapotranspiration exceeding precipitation, particularly in the summer and autumn.

2.2.3 Surface Drainage

2.2.3.1 Surface Water Drainage

The contributing surface watershed on the RMA is approximately 17,000 acres, with an additional 8,000 acres from surrounding areas. The combined roofed drainage area amounts to approximately 140 acres, while road and parking area drainage amounts to approximately 100 acres (RMA, 1975).

The local surface water drainage system in the area consists of several lakes, irrigation ditches, streams, canals, diversion ditches, storm drains, the sanitary sewer system and the South Platte River. Located in the southern section of RMA are three small lakes (Ladora, Lower and Upper Derby) with an approximate total surface area of 325 acres fed by the Highland Lateral Ditch. The principal drainages on RMA are the Sand Creek Lateral and First Creek, both of which average 10 feet wide and 2 to 6 feet deep (from the tops of the banks) with a slope of 0.002 percent. First Creek, an intermittent stream, runs from the southeast corner of RMA north-northwest toward a "bog" located at the middle of RMA's northern boundary. It then flows northwest toward the South Platte River. The Sand Creek Lateral runs from Lower Derby Lake to the north, draining into First Creek approximately 1,000 feet south of RMA's northern boundary. The lakes are drained by Sand Creek Lateral and also by Irondale Gulch which runs to the west and then the north. Irondale Gulch ends in a low point along the northwest RMA boundary. See Figure 1 for drainage systems at RMA.

The South Platte River originates in the Rocky Mountains southwest of RMA. It runs generally northeast and lies several miles north and west of RMA. The drainage ditches and channels that run through RMA eventually drain to the South Platte.

2.2.3.2 Storm Drainage System

Approximately 15 miles of drainage ditches, culverts and channels are located on RMA. These channels are sandy and lack vegetation except for some scattered weed growth. The system of culverts and drainage ditches generally drain into catchment basins. If of sufficient quantity, flow could enter First Creek and the Sand Creek Lateral from the system. If an accidental spill entered the storm drainage system, it would be necessary for containment of the spill to prevent it from entering either of the drainages.

2.2.3.3 Sanitary Sewer System

RMA operates a sewage treatment plant which handles all of the sanitary wastewater produced on the installation. The sewage treatment plant receives sanitary sewage from the facilities at RMA and any surface runoff that may enter into the sanitary sewer systems. Because of location of the tanks relative to the sewer lines, only two facilities covered by the SPCC plan could potentially discharge into the sewer system. One location is at Tank 632, in the Logistic Area (Section 3.3.1.1). The contents (diesel fuel) could flow into the sanitary sewer system via a nearby sewer drain and to the sewage treatment plant if an accidental spill occurred.

The second area is from the herbicide or insecticide mixing room located in Building 742 in the South Plant Area. Spillage during mixing is contained in the sinks in Building 742 and discharges into an above-ground wastewater storage tank. The contents are pretreated with a granular activated carbon and ion exchange system, and then discharged to the sewage treatment plant. Therefore, it is doubtful that any herbicides or pesticides would be discharged to the sewer.

RMA has two National Pollutant Discharge Elimination System (NPDES) Permits (U.S. EPA, 1981) to discharge effluent from their facilities into First Creek. One applies to process water from the North Plant and

one to the sewage treatment plant. The discharge from the sewage treatment plant is of concern since a spill from Tank 632, (Logistic Area), could enter into the sanitary sewer system. The following are the parameters and standards which cannot be exceeded:

<u>Parameter</u>	<u>30 Consecutive Day Period</u>	<u>7 Consecutive Day Period</u>
BOD (mg/l)	30	45
Total Suspended Solids (mg/l)	30	45
Fecal Coliform (number/100 ml)	2000	4000
Total Residual Chlorine (mg/l)	0.5	0.5
pH	Must remain between 6.0-9.0	

The concentration of oil and grease must not exceed 10 mg/l in any grab sample nor can a sheen be visible in the effluent. The discharge must consist only of treated sanitary sewage and ground water that has infiltrated into the sewer system.

2.3 SPCC PLAN SCOPE

The SPCC Plan applies to petroleum products and hazardous substances (such as caustic, methylphosphonic dichloride, herbicides, and pesticides) stored at RMA which were identified by RMA personnel. Hazardous wastes (such as the demilitarization salts) are not included because they are covered by the RMA RCRA Part B Permit (RMA, 1983b). The following products are covered by the SPCC Plan:

- o Gasoline
- o Diesel Fuel
- o Road Oil
- o Waste Oil
- o Fuel Oil
- o Methylphosphonic dichloride (dichloro)
- o Sodium hydroxide (caustic)
- o Herbicides and Pesticides

The petroleum products listed above are stored at various locations at RMA (Logistic, North Plant, Container Storage and South Plant Areas). These products are used as fuel sources for power plant boiler, incinerator, heating and vehicle operations.

Caustic and methylphosphonic dichloride are stored at the North Plant Area. The caustic is used in some demilitarization processes as a neutralizing agent. Methylphosphonic dichloride is used in the manufacturing process of GB. However, the manufacture of GB has not taken place since 1957 and no future plans exist to recommence its manufacture.

Herbicides and pesticides are mixed and stored in Building 742 located in the South Plant Area. These products are stored in small quantities and are generally used for vegetation and pest control at RMA.

The ISC is a contingency plan for spills and pertains to the procedures and techniques to be employed in identifying, containing, dispersing, reclaiming, and removing oil and hazardous substances used in bulk quantity at RMA.

Following are the specific locations and the type of facilities that are present at RMA for which the SPCC Plan was developed:

LOGISTIC AREA (see Figure 2)

- o Tank 632
 - 1 underground 40,000 gal. diesel tank
- o Tank CARM 10716
 - 1 underground 1,000 gal. waste oil tank
- o Motor Pool Service Station
 - 1 underground 9,000 gal. diesel tank
 - 2 underground 12,000 gal. gasoline tanks

- o Tank Farm 629A-D, 628A, and 648A and B
 - 5 aboveground 10,000 gal. diesel tanks
 - 2 aboveground 10,000 gal. asphalt and road oil tanks

NORTH PLANT AREA (see Figure 3)

- o Tank Farm 1403
 - 13 aboveground 18,000 gal. fuel oil tanks
 - 1 aboveground 10,000 gal. fuel oil tank
- o Tank Farm 1402
 - 24 aboveground 8,000 gal. methylphosphonic dichloride tanks
- o Tank 1510
 - 1 aboveground 200,000 fuel oil tank
- o Tank Farm 1505
 - 10 aboveground 18,000 gal. caustic tanks
- o Day Tank South of Building 1611
 - 1 aboveground 4,500 gal. fuel oil tanks
- o Day Tank North of Building 1611
 - 1 aboveground 1,500 gal. fuel oil tank

CONTAINER STORAGE AREA (see Figure 4)

- o Mobile Refueling Station
 - 1 aboveground 500 gal. diesel tank
 - 1 aboveground 500 gal. gasoline tank

SOUTH PLANT AREA (see Figure 5)

- o Tank Farm 745A, B and C
 - 3 aboveground 110,000 gal. diesel tanks
- o Mobile Refueling Station
 - 1 aboveground 1,000 gal. diesel tank
 - 1 aboveground 1,500 gal. gasoline tank
 - 2 aboveground 1,500 gal. gasoline tanks

- o Tank Farm 321A, B and E
 - 1 aboveground 60,000 gal. fuel oil tank
 - 1 aboveground 72,000 gal. fuel oil tank
 - 1 aboveground 400,000 gal. fuel oil tank
- o Mobile Refueling Station
 - 2 aboveground 55 gal. gasoline tanks
 - 1 aboveground 300 gal. diesel tank
- o Building 742 (herbicides and pesticides)

2.4 SPCC PLAN METHODOLOGY

An investigation of the drainage patterns around each of the tanks included in the SPCC Plan was performed to determine the possibility of localized flooding as a result of intense rainfall events. The methodology consisted of: inspection of the site grading and culvert plans (drawings) around each of the tanks; interviews with RMA personnel; and on-site inspections. The plan inspection was used to note the following key features for each tank:

- o General drainage patterns as evidenced by the topographic contour lines on the plans.
- o Closed basin areas in which fluids may pond.
- o Culverts, storm drainage or ditches which channel runoff.

The purpose of the on-site inspection was the following:

- o Verify the key features found in the plan inspection and interviews.
- o Note alterations or variances from the plans.
- o Note deficient situations.
- o Inspect the ditch and culvert conditions and drainage.

Detailed discussion on the drainage and deficient situations is provided for each tank in Chapter 3.

Investigations were conducted on the physical descriptions of each of the tanks included in the SPCC Plan. The methodology consisted of: reviewing the tank construction plans (drawings); interviews with RMA personnel; and on-site inspections. Inspection of the plans was used to determine the following key features for each tank:

- o Type of tank (aboveground or underground).
- o Tank identification number.
- o Capacity of the tank.
- o Materials of construction.

The purpose of the on-site tank inspections was the following:

- o Verify the tank location, secondary containment and drainage found in the plans, and obtained from the inspection and interviews. Tank construction materials, capacity, and inlet/outlet piping information was not verified.
- o Note alterations or variances from the plans.
- o Note deficient situations.

Detailed discussion on the physical description and deficient situations is provided for each tank in Chapter 3.

3.0 TANK DESCRIPTIONS

Chapter 3 presents detailed descriptions of each of the tanks included in the SPCC Plan. Information on the following tank features is included:

- o Physical description including the contents, capacity and the use of the tank.
- o Spill containment system around the tank and loading/unloading areas, and the surface drainage controls associated with these areas.
- o Spill history including occurrence and details of reported events.
- o Potential spills source and type of possible failures.
- o Inspection procedures used by RMA personnel.
- o Operating procedures and information on the loading/unloading activities.
- o Deficiencies noted at the tank.

Section 3.1 provides a detailed description of each tank feature listed above including references to appropriate regulations. Section 3.2 presents description of RMA's inspection and operating procedures which are standard for most of the tanks. Section 3.3 presents the detailed descriptions of each tank by location area, including the topics listed above.

3.1 DETAILED DESCRIPTION OF TANK FEATURES

3.1.1 Physical Description

The physical description of each tank is required by 40 CFR § 112.4, 112.7(e)(2)(i, ii and viii) and AR 200-1, 8-7(a-d). Included in these discussions are: location of the tank (aboveground or underground); tank identification number; capacity of the tank; tank contents; materials of construction (inside tank liner(s) and outer tank material); corrosion

protection of buried metallic tanks, if applicable, (especially at the soil/atmosphere interface); and any fail-safe engineering devices or systems installed at the tank. This information was obtained primarily from a review of tank construction plans and interviews with RMA personnel. In general, only the location, and identification number of the tanks were verified.

Any new buried installation should be protected from corrosion by coatings, cathodic protection or other effective methods compatible with the local soil conditions. There are two basic types of electrochemical corrosion (Oxford, W. F., Jr. and R. E. Foss, 1980). The first type is a reverse plating operation, which occurs when direct currents leave an underground pipe system. This is due to improper cathodic protection. The second and most common type of electrochemical corrosion occurs naturally when metal pipe or tanks are exposed in moist soil. The second type of electrochemical corrosion is the most common and most likely type to occur at RMA.

Soil characteristics, particularly salt and moisture content, affect corrosion. The presence of water and high concentrations of salts account for severe corrosion by causing electrochemical reaction with oxygen. The water in the soil acts as the transport and reaction medium. Therefore, corrosion in very dry soils is minor. Salts must also be present. The salt content of the soil supplies the ions which are needed for chemical reactions to occur. Some salts (calcium, sodium, potassium, chloride, bicarbonate, and sulfate ions) are generally present in all soils, although the amounts vary with soil type. Sandy soils frequently contain very low concentrations of salts due to migration and leaching of the ions by infiltrating precipitation or ground water flow. Therefore, corrosion is usually minor in sandy soils.

Limestone (a major component of concrete) has an effect on these reactions. It allows a chalky (calcareous) layer to form a somewhat protective coating on the pipe or metal in the contact area between the metal and soil (cathodic area). This reduces the amount of surface available for reaction and thus decreases corrosion.

Fail-safe engineering designs are also important in spill prevention. New and old tank installations should, as far as practical, be fail-safe engineered or updated into a fail-safe engineered installation to avoid spills. Consideration should be given to providing one or more of the following devices:

- o High liquid level alarms with an audible or visual signal at a constantly manned operation or surveillance station. In smaller plants an audible air vent through which the liquid level can be heard may suffice.
- o Considering size and complexity of the facility, high liquid level pump cutoff devices set to stop flow at a predetermined tank content level.
- o Direct audible or code signal communication between the tank gauger and the pumping station.
- o A fast response system for determining the liquid level of each bulk storage tank such as digital computers, telepulse, or direct vision gauges or their equivalent

3.1.2 Spill Containment System

Discussion of the spill containment system is required by 40 CFR § 112.7(c)(1)(i-vi), 112.7(i)(e)(1-11), 112.7(e)(2)(11) and AR 200-1, 3-7(a-b). Tanks used for the storage of oil or hazardous substances should be constructed in a manner and with materials that are compatible with the expected contents and conditions of storage such as pressure and temperature. Bulk storage tank installations should be constructed so a secondary means of containment is provided for the entire contents of the largest single tank plus sufficient freeboard to allow for

precipitation. One of the following containment and/or diversionary structures should be used as a minimum:

- o Dikes, berms or retaining walls sufficiently impervious to contain spilled oil;
- o Curbing;
- o Culvert, gutters or drainage systems;
- o Weirs, booms or other barriers;
- o Spill diversion ponds or ditches;
- o Retention ponds;
- o Sorbent materials.

Dikes, containment curbs, and pits are commonly employed for this purpose, but may not always be appropriate. An alternative system could consist of a complete drainage trench enclosure arranged so that a spill could terminate and be safely confined in a catchment basin or holding pond. Drainage from diked storage areas should be restrained by valves or other means to prevent a spill or excessive leakage of oil into the drainage system or in-plant effluent treatment system, except where systems are designed to handle such leakage. Diked areas may be emptied by pumps or ejectors which should be manually operated, and the condition of the accumulated fluid analyzed before starting to be sure that no oil will be discharged into the water system. Valves used for the drainage of diked areas should be of manual, open and closed design. Flapper-type drain valves should not be used to drain diked areas because they tend to clog. Drainage from undiked areas should, if possible, flow into ponds, ditches or catchment basins, designed to retain oil or return it to the tank.

3.1.3 Spill History

Discussion on the spill history of the specific facility is required by 40 CFR § 112.7(a) and AR 200-1, 3-7(b). The date that a spill occurred,

description of the spill, corrective action taken and plans for preventing recurrence must be included in the discussion.

3.1.4 Potential Spills

Where the potential exists for equipment failure (tank overflow, rupture or leakage), the plan should include a prediction of the direction, rate of flow, and total quantity of material which could be discharged as a result of each major type of failure as required by 40 CFR § 112.7(b) and AR 200-1, 8-7(a).

3.1.5 Inspection Procedures

Discussion of the inspection procedures at each tank is required by 40 CFR § 112.7(e)(2)(ii, iv and vi), and AR 200-1, 8-7(d)(3). Aboveground tanks should be subject to periodic integrity testing, taking into account tank design and using such techniques as hydrostatic testing, visual inspection (for leakage around valves, gaskets, seams, rivets), or a system of non-destructive shell thickness testing. Comparison records should be kept where appropriate, with tank supports and foundations included in these inspections. In addition, the outside of the tank should be frequently observed by operating personnel for signs of deterioration, leaks which may result in a spill, or accumulation of materials inside diked areas. Permanent aboveground tanks should be inspected annually to determine the need for cleaning. The inspection should include obtaining a bottom sample. If the sample indicates an appreciable accumulation of unpumpable sludge or sediment, the interior should be cleaned and inspected in accordance with (TM5-678, "Repairs and Utilities Petroleum, Oils and Lubricants" (POL) Department of Army Technical Manual, U.S. Army, 1965). The installed liquid level sensing devices should be tested regularly to insure proper operation.

In general, underground tanks have a very low potential for significant spillage. However, they are susceptible to leaks, which, if not readily detected and repaired, can cause significant pollution particularly to ground water.

Underground tanks should be gauged for quantity on a daily basis and the results recorded in a unit inventory log or inspection checklist (see Table 1). Under static storage conditions, any noticeable decrease or increase indicates leakage. An increase in quantity can occur when water leaks into the tank. If the stored product is removed or added between gauge checks, any discrepancy between the gauged quantity and the calculated quantity beyond the allowable percentage loss for the particular product may indicate leakage.

Underground tanks should be inspected annually to determine the need for cleaning. The inspection should include obtaining a bottom sample. If the sample indicates an appreciable accumulation of unpumpable sludge or sediment, the interior should be cleaned and inspected in accordance with TMS-678 (U.S. Army, 1965). Underground tanks should be subjected to regular pressure testing to check for leakage which may occur at the seams, rivets and valves. Regular monitoring of the quantity of the substance should be performed while the substance is being consumed and stored.

Inspection of the fill and vent pipes for corrosion and pitting should be performed regularly. New installations should be protected from corrosion by coatings, cathodic protection or other effective methods compatible with the soil conditions. Inspection of the containment or diversionary system should be performed regularly to check for deterioration or leakage within the system. A complete record of the inspections should be established for each tank.

3.1.6 Operating Procedures and Information

Discussion on the operating procedures and information is required by 40 CFR § 112.7(4)(a)(1-iv) and AR 200-1, 3-7(a-d). Tank truck loading/unloading procedures should meet the minimum requirements and regulations established by the U.S. Department of Transportation. Where rack area

drainage does not flow into a catchment basin or treatment facility designed to handle spills, a quick drainage system should be used for tank truck loading/unloading areas. A quick drainage system might consist of a pit, small drainage ditch or culvert. The containment system should be designed to hold at least the maximum capacity of a single compartment of a tank car or tank truck which is loaded or unloaded in the area.

An interlocked warning light, or physical barrier system, or warning signs, should be provided in loading/unloading areas to prevent vehicular departure before complete disconnect of flexible or fixed transfer lines. The operator should be in attendance at all times during the loading/unloading. Prior to filling and departure of any tank car or tank truck, the lower most drain and all outlets of such vehicles should be closely examined for leakage, and if necessary, tightened, adjusted or replaced to prevent liquid leakage while in transit. Prior to the loading of the tank, the operator should verify the tank capacity and the inspection report of the tank.

3.1.7 Deficiencies

Discussion of the deficiencies (if applicable) at each tank is required by AR 200-1, 8-7 (c) and focuses on the following items:

- o Lack of containment system or diversionary structures around the tank.
- o Condition of the containment system or diversionary structures around the tank.
- o Lack of containment system or diversionary structures at the loading/unloading area.
- o Condition of the containment system or diversionary structures at the loading/unloading area.
- o Lack of fail-safe engineering designs.

- o Lack of proper corrosion protection of underground metallic storage tanks and aboveground storage tanks.
- o Potential spills (leakage from valves, gauges, gaskets, seams, rivets and/or tanks deterioration).

3.2 INSPECTION AND OPERATING PROCEDURES

RMA has Standard Operating Procedures (SOP's) which establish the inspection and operating procedures for the tanks and the related loading/unloading areas. The following section includes a description of the inspection and operating procedures performed at RMA. These procedures apply to most of the tanks included in the SPCC Plan. Variances from the described procedures are discussed with the specific tank in Section 3.3.

3.2.1 Inspection Procedures

As discussed in SOP ISN-12 (RMA, 1982a), a systematic preventive maintenance program has been implemented at RMA to limit the potential of a spill. The following are the guidelines and references which have been used in developing this maintenance program:

- o Bulk storage tanks are inspected monthly for seepage of fuel at butt-weld plate seams, riveted or bolt joints, and drain valves. Seepage may be detected by wet spots and paint decoloration. Seepage at the butt or lapped seams are corrected immediately TMS-678 (U.S. Army, 1965). Tanks should have dikes surrounding them capable of holding 110 percent of the tank contents.
- o Grounding points (protection from corrosion) are inspected annually to insure that they properly dissipate electrical charges.
- o Pump meters are calibrated semiannually and adjusted or replaced as necessary. Calibration and testing are conducted by a state agency.
- o Accumulation of water within the containment system is analyzed prior to its removal.

- o Preventive maintenance inspections of service station pumps, hoses, loading arms, tank condition (leaks around valves, seams, gaskets, rivets, etc.) and containment systems are performed monthly (U.S. Army, no date, TM5-687)..
- o Bulk storage tanks shall be cleaned in accordance with the requirements outlined in TM10-1114 (U.S. Army, no date). Internal and external corrosion will be assessed and the general condition of the tank evaluated.
- o Pipes, valves and fittings are inspected monthly for leakage, split joints, accidental punctures, cracked welds and internal and exterior corrosion. Leakage may be detected by pressure checks, foot and air patrol, or watering the through-pipe of the product at various locations along the pipeline.
- o Containment systems should contain at least 110 percent of the storage capacity; adequate enough to contain the maximum capacity of the single largest tank and allow sufficient freeboard for precipitation.

3.2.2 Operating Procedures

Safety is the primary consideration at RMA in handling petroleum products and hazardous materials. Because of the potential for fire, health or explosion hazards. RMA personnel are trained in safe handling practices to prevent injuries and spills due to damaged equipment. As discussed in SOP ISN-12 (RMA, 1982a), the following general safety and operating procedures have been implemented at RMA to ensure safe and efficient loading/unloading processes:

- o Tanker loading/unloading operations take precedence over all other tasks and activities in the immediate area.
- o The RMA Fire Department is notified when flammable or hazardous substances are being loaded/unloaded.

- o An interlocked warning light, physical barrier system or warning signs are provided in the loading/unloading areas to prevent vehicular departure before complete disconnect of flexible or fixed transfer lines. The operator is in attendance at all times during the loading/unloading.
- o Hose, valves, connections and pumps are inspected for leakage and/or damage. If deficiencies are noted, appropriate action is taken to correct the deficiency to prevent any liquid leakage.
- o Rules prohibiting smoking have been established and are strictly enforced. Adequate "No Smoking Within 50 Feet" signs are prominently displayed.
- o Fire extinguishers and other fire fighting equipment are accessible and operable at the tanks.
- o Open flames, heating stoves and other flame or spark producing or generating equipment are prohibited from operating in the immediate vicinity of any petroleum products supply area.
- o Nozzles with notched handles, which allow for unattended transfer, are not used for transferring. Nozzles are tended constantly during transferring operations and are equipped with automatic shutoffs.
- o Drainage tubs and other suitable containers are placed under all hose connections, faucets and similar locations to collect potential leakage.
- o Inspections are conducted on equipment, safety devices and working areas to insure personal and operational safety and to correct potential or actual hazards.
- o Adequate ventilation is provided in the working and storage areas.
- o Flame and spark arrestors are provided for equipment within or adjacent to the storage areas.

3.3 TANK DESCRIPTIONS

A detailed description of each tank included in the SPCC Plan including the tank features discussed in Section 3.1 is presented in this section. The tanks are grouped by the areas in which they are located. These areas are the Logistic Area, North Plant Area, Container Storage Area and South Plant Area. Figure 1 presents an overall RMA location map. Figures 2, 3, 4 and 5 indicate the specific tanks included in the SPCC Plan in the four areas listed above, respectively.

Information on tank size and maximum capacity was obtained primarily from the report entitled "Real Property Inventory, Volumes I-IV," March 1983, by Commonwealth Associates, et al. (Commonwealth, 1983). Information on some tank maximum capacities, tank materials, contents, and current storage volumes was obtained from RMA personnel. Information on spill containment systems and site drainage was obtained primarily by IT Corporation in April 1983 and updated in June 1984.

3.3.1 Logistic Area

The Logistic Area is located in the southwest portion of RMA (see Figures 1 and 2). The tanks discussed in the following sections are located within this area.

3.3.1.1 Tank 632

Physical Description

Tank 632 is an underground storage tank located in the Logistic Area, west of Building 613 (see Figure 2). The tank was built in 1942, constructed of welded steel plates, and has a maximum capacity of 40,000 gallons. It contains diesel fuel that is used for the auxillary boiler (Building 632), which is used when the main power plant is slowed down.

The surface area is approximately 80 feet long and 20 feet wide enclosed by a chain supported on posts. In the north central portion of the

chained area there is a 3 to 4 inch thick concrete pad on the ground surface. The dimensions of the concrete pad are approximately 25 feet long and 6 feet wide. The concrete pad protects the tank from the potential of being ruptured by rocks or vehicles driving over the top of the tank. The presence of the concrete pad also tends to act as a corrosion inhibitor between the steel tank, soil and atmosphere. There are three steel plates cast into the top of the pad. South of the pad is a small concrete pad (about 2 feet by 2 feet) that contains the filler pipe for this tank.

No high fluid level alarms or automatic shutoff devices are present in this tank. A volume level indicator is constructed within the tank to monitor the fluid level. This indicator can be read at ground surface. Minimal fire protection is provided at this tank (see Table 2).

Spill Containment System

The ground surface slopes at 4 to 8 percent to the north from this tank. No aboveground or underground containment or diversionary structures are associated with this underground tank or its loading/unloading area. The loading/unloading area is located approximately 20 feet from the main portion of the tank. A storm drain (grated opening) is located approximately 20 feet to the north of this tank. This tank is loaded/unloaded by mobile fuel trailer trucks. If an accidental spill did occur while loading/unloading the tank or if leakage occurred from the tank, the contents (diesel fuel) would flow down slope and into the storm drain. Containment and/or removal of the spill once it entered the drain would be necessary to prevent it from entering into the storm drain system and possibly water ways via the storm drain system.

No shutoff devices or containment system are present in the storm drain runoff at the tank.

Spill History

No reported spills have occurred from this tank.

Potential Spills

The following indicates potential types of equipment failures and a prediction of the direction, rate of flow and the total quantity of diesel fuel which could be discharged from the tank as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Diesel Fuel	Ruptured tank	40,000	Dependent on rupture size	To the north towards the storm drain	None
Diesel Fuel	Spill or overflow during loading/unloading	Dependent on quantity in the tanker and discharge rate	Dependent on discharge rate	To the north towards the storm drain.	None

Inspection Procedures

The inspection procedures for this tank are described in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at this tank:

- o No containment or diversionary structures are present.
- o No containment or diversionary structures are present at the loading/unloading area.
- o No gate valves or shutoffs in the storm drain are located near the tank to prevent the spill from entering into the storm drain system.
- o No high fluid level alarms are present.

3.3.1.2 CARM 10716

Physical Description

CARM 10716 is an underground storage tank located in the Logistic Area, at the southwest corner of Building 627 (see Figure 2). The tank was constructed of carbon steel plates and has a maximum capacity of 1,000 gallons. This tank contains waste oil from vehicles. The oil is discharged into the tank from inside Building 627. There are 4 wooden posts approximately two feet in height surrounding the pumpout pipe and a vent pipe. The pumpout pipe is 8 to 10 inches in diameter and covered with a lid. The waste oil is removed from the tank through this pipe. There is no apparent concrete pad on top of the tank. No high fluid level alarms, automatic shutoff devices, or gauges are present in this tank to monitor the fluid level. Minimal fire protection is provided at this tank (see Table 2).

Spill Containment System

The area is essentially flat with a less than one percent gradient to the west. No aboveground or underground containment or diversionary structures are associated with this underground tank or its loading/unloading areas. If an accidental spill did occur while loading/unloading or if leakage occurred from the tank, the contents (waste oil) would tend to pond and accumulate on the ground surface. Approximately 50 feet to the west of this tank is a storm runoff collection ditch. This ditch is connected to other ditches which flow to the north and discharge in a low area on RMA.

Spill History

No reported spills have occurred from this tank.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow, and the total quantity of waste oil which could be discharged from the tank as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Waste Oil	Ruptured tank	1,000	Dependent on rupture size	Slight movement to the west of the tank location	None
Waste Oil	Spill or overflow during loading/unloading	1,000	Dependent on discharge rate	Ponding of the contents to the west of the tank	None

Inspection Procedures

The inspection procedures for this tank are described in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at this tank:

- o No containment or diversionary structures are present.
- o No containment or diversionary structures are present at the loading/unloading area.
- o No fail-safe engineering designs such as high fluid level alarm, automatic shut offs, or gauges to monitor the fluid level.
- o No concrete pad to act as corrosion protection.

3.3.1.3 Motor Pool Service Station

Physical Description

The motor pool service station tanks include: 1 underground 9,000 gallon diesel fuel tank; and 2 underground 12,000 gallon gasoline tanks located in the Logistic Area south of Building 629E (see Figure 2). The tanks are constructed of welded carbon steel plates.

A 6 inch thick concrete pad covers the tanks' filler and vent pipes at the ground surface. The concrete pad protects the tank from rupture and also tends to act as a corrosion inhibitor between the carbon steel tank, soil and atmosphere.

No high fluid level alarms or automatic shutoff devices are present in these tanks. A volume level indicator constructed within these tanks are used to monitor the fluid level. These indicators can be read from the ground surface. Tank volumes are also checked using a dip stick to measure fluid level in the tanks. Minimal fire protection is provided at these tanks (see Table 2).

Spill Containment System

The area is essentially flat with a slight gradient of less than 1 percent to the east and south. If an accidental spill did occur while transferring fuel to the tanks or if leakage occurred from a tank, the contents would tend to pond and accumulate on the ground surface. Presently, no aboveground or underground containment or diversionary structures are associated with these tanks or loading/unloading areas.

Spill History

No reported spills have occurred from these tanks.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow, and the total quantity of diesel fuel or gasoline which could be discharged from the tanks as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Diesel Fuel	Ruptured tank	9,000	Depend- ent on rupture size	Ponding of contents around tank	None
	Spill or overflow during loading/ unloading	9,000	Depend- ent on discharge rate	Due to the slight gradient to the east and south, the contents would pond on the ground in those directions	None
Gasoline	Ruptured tank	12,000	Depend- ent on rupture size	Ponding of contents around tanks	None

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
	Spill or overflow during loading/ unloading	12,000	Depend- ent on discharge rate	Due to the slight gradient to the east and south, the contents on the ground would pond in those directions	None

Inspection Procedures

The inspection procedures for these tanks are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at these tanks:

- o No containment or diversionary structures present.
- o No containment or diversionary structures at the loading/unloading area.
- o No high fluid alarms present.

3.3.1.4 Tank Farm 629 A-D, 628A and 648 A and BPhysical Description

This tank farm contains 7 aboveground tanks located in the Logistic Area, west of Building 627 (see Figure 2). These tanks were constructed in 1942 and 1943. Tanks 629 A-D and 628 A were constructed of welded steel plates and are used for storage of diesel fuel. The diesel fuel is used as an auxillary fuel source for the vehicles at the Logistic Area. Following are the dimensions and capacities for Tanks 629 A-D and 628 A (Commonwealth, 1983):

TANK IDENTIFICATION	DIMENSIONS	MAXIMUM CAPACITY (gallons)
629 A	15'-5" diameter by 8'-10" high	10,000
629B	15'-5" diameter by 8'-1" high	10,000
629C	15'-5" diameter by 8'-4" high	10,000
629D	15'-5" diameter by 8'-1" high	10,000
628A	15'-5" diameter by 8'-1" high	10,000

There are CO₂ foam fire extinguishers located on the west side of these tanks. There are no constructed foundations under the tanks that would provide protection against corrosion. These tanks have no apparent leaks and appear to be in good condition. An earthen berm surrounds each tank.

Tanks 648 A and B contain a mixture of asphalt, road oil and water. The asphalt and road oil was formerly used for paving operations at RMA. Tanks 648A and B are each 15'-4" in diameter and 8 feet high (Commonwealth, 1983). The tanks are located about 3.5 feet above the ground surface on a concrete foundation 17 feet by 17 feet in plan. Maximum capacity of each tank is 10,000 gallons and the tanks were constructed of riveted steel plates. No high fluid level alarms or automatic shutoff devices are present in these tanks. No fire protection or utilities are provided. Both tanks are in poor condition.

Spill Containment System

The area is essentially flat with a slight (approximately 1 percent) gradient to the north. The containment systems surrounding Tanks 629 A-D and 628 A are earthen berms. These berms are constructed of fine grained soils. There is no vegetation or erosion protection (i.e., gravel) on the berms and they have deteriorated from erosion. The top of the berms are rounded and the side slopes flattened with some small gullies. Each of the berms were surveyed with a hand level, rod and tape measure to determine the approximate berm height and dimensions. The following presents the containment dimensions and capacities of each of the berms surrounding the tanks:

TANK IDENTI- FICATION	BERM AREA			MINIMUM BERM HEIGHT (ft)	VOLUME (cf)	VOLUME (gallons)
	TOP (sf)	BOTTOM (sf)	AVERAGE (sf)			
629 A	1,785	1,170	1,480	1.1	1,620	12,000
629 B	1,490	970	1,230	1.1	1,350	10,000
629 C	1,365	850	1,110	1.2	1,330	10,000
629 D	1,425	910	1,170	1.0	1,170	8,800
628 A	1,470	1,060	1,265	1.2	1,520	11,000

The earthen berms surrounding tanks 629A and 628A will fully contain the maximum capacity of the tank (10,000 gallons) with an allowance for precipitation and freeboard. The earthen berm surrounding Tanks 629B

and 629C will only contain the maximum capacity of the tank. However, these containment structures do not allow for any freeboard or precipitation containment. The earthen berm surrounding Tank 629D will not fully contain the maximum capacity of the tank. If a spill did occur, the contents would spill out over the northwest corner (low point of berm) and either collect along the gravel road west of the tanks or possibly accumulate on the ground near the tanks.

Tanks 648 A and B do not have any containment or diversionary structures. These tanks reportedly contain a mixture of approximately 2,000 gallons of asphalt, road oil and water. If an accidental spill did occur, the direction of flow would be dependent on which side of the tank the spill occurred. If the spill occurred on the east side of the tanks, the spill would flow and accumulate to the east (direction of surface flow) in the storm runoff collection ditches 50 feet away. These ditches are interconnected and flow to the northwest where they end in a low area on RMA. If the tanks were completely emptied, the contents would overflow these ditches and tend to accumulate on the ground surface north of CARM 10716 tank. If the spill occurred on other sides of the tanks, the flow would be in that direction and the contents would tend to accumulate on the ground near these tanks.

The loading/unloading areas around Tanks 629A-D, 628A and 648A and B do not have any containment or quick drainage systems. The loading/unloading of these tanks are conducted on the west side from a gravel road. If an accidental spill occurred while loading/unloading, the contents would flow very gradually to the north and south along the gravel road.

Spill History

No reported spills have occurred from these tanks.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow, and the total quantity of diesel fuel or asphalt-water mixture which could be discharged from the tanks as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Regular Diesel Fuel Tank 629 A	Ruptured tank	10,000	Depend- ent on the size of rupture	None	Fully Con- tained
	Spill or overflow during loading/ unloading	Depent- ent on quantity in the tanker and dis- charge rate	Depend- ent on the dis- charge rate the west side	Accumula- tion of contents on the ground on	None
Regular Diesel Fuel Tank 629 B	Ruptured tank	10,000	Depend- ent on the size of the rupture	Over the northwest corner of the berm	Containment of 10,000 gallons does not allow for precipita- tion and freeboard
	Spill or overflow during loading/ unloading	Depent- ent on quantity in the tanker and dis- charge rate	Depend- ent on discharge rate ground on the west side	Accumula- tion of contents on the	None

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Regular Diesel Fuel Tank 629C	Ruptured Tank	10,000	Depend- ent on the size of the rupture	Over the northwest corner of the berm	Containment of 10,000 gallons does not allow for precipita- tion and freeboard
	Spill or overflow during loading/ unloading	Depend- ent on quantity in the tanker and dis- charge rate	Depend- ent on discharge rate on the west side	Accumula- tion of contents on the ground	None
Regular Diesel Fuel Tank 629D	Ruptured tank	10,000	Depend- ent on the size of the rupture	Over the northwest corner of the berm	Contain- ment of 8800 gallons
	Spill or overflow during loading/ unloading	Depend- ent on quantity in the tanker and dis- charge rate	Depend- ent dis- charge rate ground on the west side of the berm	Accumula- tion of contents on the	None
Regular Diesel Fuel Tank 628A	Ruptured Tank	10,000	Depend- ent on the size of the rupture	None	Fully Con- tained

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
	Spill or overflow during loading/ unloading	Depend- ent on quantity in the tanker and dis- charge rate	Depend- ent on discharge rate ground on the west side	Accumula- tion of contents on the	None
Asphalt and Water Mix- (Tanks 648 A and B)	Ruptured tank	10,000	Depend- ent on the size of rupture the rupture	Depend- ent on the loca- tion of	None
	Spill or overflow during loading/ unloading	Depend- ent on quantity in the tanker and dis- charge rate storm runoff ditches	Depend- ent on the dis- charge rate eastward towards	Accumula- tion of contents or slight movement	None

Inspection Procedures

The inspection procedures for these tanks are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at these tanks:

- o The berms are constructed of fine-grained soils which will temporarily contain spills, but the

soils are not sufficiently impervious to prevent seepage and contamination of the berms and containment area soils will occur.

- o The berms have been deteriorated by wind and water erosion.
- o No constructed foundations exist under Tanks 629A, B, C, D and 628A that would provide protection against corrosion.
- o The berm surrounding Tank 629D will not fully the maximum capacity of the tank. The berms surrounding Tanks 629B and 629C will only contain the capacity of the tanks with no allowance for precipitation.
- o No containment or diversionary structures exist at Tanks 648A, and 648B. Tanks are in poor condition.
- o No containment or diversionary structures exist at the loading/unloading area.
- o No fail-safe engineering designs exist such as high fluid alarms or gauges to monitor fluid levels in Tanks 648 and 648 B.
- o No fire protection or utilities are provided at Tanks 648 A and 648 B.

3.3.2 North Plant Area

The North Plant Area is located in the north central portion of RMA (see Figures 1 and 3). The tanks discussed in the following sections are located in this area.

3.3.2.1 Tank Farm 1403

Physical Description

The tank farm includes a baffled, concrete pit 107 feet by 79 feet by 4 feet deep with 14 elevated, horizontally mounted tanks. This tank farm is located in the North Plant area, southeast of Building 1501 (see Figure 3). These tanks reportedly contain fuel oil which supplies the North Plant incinerator complex. The baffles are arranged to accom-

moderate one group of six tanks, three groups of two tanks each and two tanks individually. Thirteen of the tanks have a capacity of 18,000 gallons each and the other tank is 10,000 gallons. The tanks are constructed of welded steel plates. Each of the tanks are supported on concrete piers about 7 feet above the concrete pit floor.

The concrete pit is located below grade with the floor slab about 3 feet below the ground surface. The outer and inner (baffles) pit walls are 8 inches thick. The pit is divided along its length into two (east and west) halves. The west half is further divided into two compartments (Compartments 1 and 2) and the east half into four compartments (Compartments 3, 4, 5, and 6). Detailed physical conditions of each compartment follow:

- o Compartment 1 (southwest corner) containing 1 - 10,000 gallon tank:
 - Vegetation growth in the containment wall construction joints and between the floor slab, containment walls and tank piers.
 - Floor slab is severely spalled in areas.
 - Top 2-3 inches on the east and south side of the wall are cracked.
- o Compartment 2 (west side) containing 6-18,000 gallon tanks:
 - Vegetation growth in the containment wall construction joints and between the floor slab, outer containment wall and tank piers.
 - Floor slab is spalled in areas.
 - In the middle of this compartment on the west side is a sump which is approximately 3 feet square in plan and was filled with oily water. The sump flows to the chemical waste collection system (RMA, 1984) North Plant.
 - Minor spalling of several concrete tank piers.

- o Compartments 3, 4, and 5 (east side) each containing 2-18,000 gallon tanks:
 - Vegetation growth in the containment wall construction joints and between the floor slab, outer containment wall and tank piers.
 - Floor drains (approximately 6 inch diameter grates) are located in each of these compartments along the east side. The floor drains flow to the chemical waste collection system for the North Plant area (RMA, 1984).
 - Varying degrees of spalled concrete on the floor slab.
- o Compartment 6 (southeast corner) containing 1-18,000 gallon tank:
 - Vegetation growth in the containment wall construction joints and between the floor slab, outer containment wall and tank piers.
 - A floor drain is located in the middle of the compartment along the east wall. The floor drain flows to the chemical waste collection system for the North Plant area (RMA, 1984).
 - Some spalling of concrete on the floor slab.

These tanks are filled from a 4 inch diameter pipe located in a concrete trough which runs along the southern side of the tank farm. The pipe comes out of the trough and runs up and along the top of the tanks. There are no high fluid levels or automative shutoff devices present. The volume level indicators for these tanks are either in need of repair or completely missing. Minimal fire protection is provided for this Tank Farm (see Table 2).

Spill Containment System

The containment system surrounding the tank farm is a concrete pit. The system is divided into six individual compartments. The following is a list of the compartments, dimensions, number of tanks, and total capacity for each compartment:

COMPART- MENT NO.	INSIDE DIMENSIONS (FT)	NUMBER OF TANKS	VOLUME OF THE LARGEST TANK IN THE COMPARTMENT (gallons)	VOLUME OF THE LARGEST TANK +10% FOR FREE- BOARD & PRECIPITATION	COMPART- MENT CAPACITY (gallons)
1	14.5' x 39.5'x4'	1	10,000	11,000	17,000
2	86.4' x 39.5'x4'	6	18,000	19,800	102,000
3	28.8' x 39.5'x4'	2	18,000	19,800	34,000
4	28.8' x 39.5'x4'	2	18,000	19,800	34,000
5	28.8' x 39.5'x4'	2	18,000	19,800	34,000
6	14.5' x 39.5'x4'	1	18,000	19,800	17,000

Compartments 1-5 will fully contain the capacity of the largest single tank with allowances for precipitation and freeboard. There are also floor drains in Compartments 3-5 and a sump in Compartment 2 into which a spill would flow. The floor drains and sump lead to the chemical waste collection system at the North Plant area. If a spill did enter the waste collection system it would have to be treated and remove from the system. Compartment 6 would not fully contain the maximum capacity of the tank unless the contents flowed directly into the floor drain and into the chemical waste collection system. If the drain was clogged or closed it would overflow the compartment wall and flow to the east over the ground.

The ground surface slopes at approximately 2 percent to the east from the tank farm. Located approximately 70 feet east of the tank farm is a storm runoff drain (grated opening). The grated opening drains to a culvert, to a ditch, and eventually to an unnamed tributary of First Creek. If a major spill occurred and was not fully contained by the concrete pit, the contents could flow into the storm runoff drain and into the uppermost portion of the unnamed, intermittent tributary to First Creek. Containment and/or removal of a spill from this system would be necessary to prevent it from entering First Creek. No shutoff devices or containment systems are present in the storm drain.

The loading/unloading area for the tank farm (located southwest of Tank 1510, see Figure 3) does not have any containment or quick drainage system. The area is essentially flat on the west side of loading/unloading facility. An accidental spill in this area would accumulate and pond in the parking lot. If the accidental spill involved a large quantity, the contents would flow along the asphalt road and into culverts and runoff ditches. The interconnected culvert system flows to the east into First Creek. The gradient on the east side of this loading/unloading facility is approximately 6 percent to the east. An accidental spill in this direction would flow and tend to accumulate on the ground. However, it is also possible for some of the contents to enter the culvert system discussed above.

The pipeline from the loading/unloading facility to the tank farm is aboveground. It is contained in a concrete trough 5 feet wide by 1 foot deep by 350 feet long. This containment structure would be able to contain a portion of any leakage, but could not handle major spills.

Spill History

No reported spills have occurred from this tank farm.

Potential Spills

The following indicates a reasonable potential for equipment failure and a prediction of the direction, rate of flow, and the total quantity of fuel oil which could be discharged from the tank farm as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Fuel Oil Compartment 1	Ruptured tank	10,000	Depend- ent on rupture size	None	Fully Con- tained
Fuel Oil Compartment 2-5	Ruptured tank	18,000 for each compartment	Depend- ent on rupture size	Into the floor drains or sump and into the chemical waste col- lection system	Fully con- tained
Fuel Oil Compartment 6	Ruptured tank	18,000	Depend- ent on rupture size	Into the floor drain and into the chemical waste col- lection system. If drain clog- ged, over the ground to the east.	Contain- ment of 17,000 gallons in the compartment only
Fuel Oil	Spill or overflow during loading/ unloading	Depend- ent on discharge rate and quantity in the tanker	Depend- ent on discharge rate and quantity in the tanker	To the east accumulating in the storm drain and upper portion of an unnamed intermittent tributary of First Creek	None

Inspection Procedures

The inspection procedures for this tank farm are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at this tank farm:

- o The following were observed in the containment compartments.
 - Construction joints between the floor slab, outer containment wall, and tank piers. Vegetation growth is present in some joints indicating gaps which would result in leakage.
 - Vertical construction joint gaps in the outer containment wall. Vegetation growth is present in some joints indicating gaps which would result in leakage.
 - Floor slab is severely deteriorated (spalled) in several areas and may not be adequate to prevent leakage.
 - Compartment 6 will not fully contain the maximum capacity of the tank.
- o No containment or diversionary structures located at the loading/unloading area.
- o No fail-safe engineering designs such as high fluid alarms, automatic shut offs or gauges to monitor the fluid levels.
- o No gate valves or shutoff devices in the storm drain runoff to prevent the spill from entering the unnamed intermittent tributary of First Creek.

3.3.2.2 Tank Farm 1402Physical Description

The tank farm is located in the North Plant area, south of Building 1501 (see Figure 3). It consists of two concrete pits each 105 feet by 33.5

feet by 2.5 feet deep (inside dimensions) containing a total of 24 steel, glass lined, vertically mounted tanks. Each tank is supported on 8-3 inch diameter pipe legs on concrete footings.

The two pits share a common middle wall along the length. There is an 8 inch diameter hole at the base of the wall which connects the two pits. Liquid and sludge (green) covered the floor in the eastern pit and the western pit was dry and clean. There are construction joints in the walls and floor slab and between the floor, wall and tank footings. Vegetation was present in some construction joints in the western pit. No vegetation growth was present in the eastern pit, but the condition of the construction joints could not be determined because of the liquid and sludge.

The capacity of each of the 24 tanks is 8,000 gallons. As of April 1983, the east pit contained 6 full tanks and 10 empty tanks while the west pit contained 8 empty tanks (never filled) and space for 8 additional tanks. Reportedly, 48,000 gallons of methylphosphonic dichloride (dichloro) are stored in these tanks. Dichloro was used in the nerve agent GB manufacturing processes. The tanks were constructed in 1951 of the following materials:

- o Inner glass liner
- o Inner carbon steel liner
- o Cork liner
- o Outer carbon steel liner

The tanks that have been used to store the dichloro are in various stages of deterioration. The contents have corroded the tanks from the inside out. FMA is in the process of reclaiming these tanks by removing the outer carbon steel and cork liners, and replacing them with a fiberglass shell. Fiberglass is inert to the chemical reactions of dichloro and is a more compatible material for tank construction.

There are no high fluid level alarms or automatic shutoff devices present in these tanks. Fluid level indicators constructed within these tanks are used to monitor the fluid level. Minimal fire protection is provided at this Tank Farm (see Table 2).

Spill Containment System

Each containment structure has a capacity of 8,800 cubic feet or approximately 66,000 gallons. Therefore, the 48,000 gallons of dichloro stored in the 6 tanks in the east pit would be fully contained if an accidental spill occurred. However, dichloro hydrolyzes with water forming hydrochloric and methyl phosphonic acids. These acidic liquids are very corrosive and will react rapidly with the cement component in the concrete. The reaction will effectively dissolve the concrete. Therefore, the concrete containment structure, although it has adequate capacity, is not considered suitable.

The area slopes at approximately 2 percent to the east from these tanks. If an accidental spill occurred during loading/unloading it would be possible that the spill could enter the storm drain runoff, located to the east of Tank Farm 1403. Containment and/or removal of the spill would be necessary to prevent it from entering the upper portion of the unnamed intermittent tributary to First Creek. No shutoff devices or containment systems are present in the storm runoff drain near this tank farm.

Spill History

No reported spills have occurred from this tank farm.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow, and the total quantity of dichloro which could be discharged from the tank farm as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Dichloro	Ruptured tank	8,000	Dependent on size of the rupture	None	Fully contained
Dichloro	Spill or overflow during loading/unloading	Dependent on discharge rate and quantity being transferred	Dependent on discharge rate	To the east towards storm drain near Tank Farm 1403	None

Inspection Procedures

A systematic inspection and preventive maintenance program has been implemented at RMA to limit the potential of a dichloro discharge. The following are the guidelines which were used in developing this program (TM5-678, U.S. Army, 1965):

- o Bulk storage tanks are inspected monthly for seepage of dichloro at butt-weld plate seams, riveted or bolt joints, and drain valves. Seepage may be detected by wet spots and paint deterioration. Seepage at the butt or lapped seams should be corrected immediately.
- o Grounding points (protection from corrosion) are inspected annually to insure that they properly dissipate electrical charges.
- o Accumulation of water within the containment structure is analyzed prior to its removal. Removal of accumulated water within the containment structure should be performed immediately.
- o Preventive maintenance inspection of pumps, hoses, loading arms, tank condition (leaks around valves, seams, gaskets, rivets, etc.) and containment structures are regularly performed.

Operating Procedures and Information

The following are specific operating procedures and information relative to the dichloro (Hazardous Component Safety Data Sheet - 20045, Reference Specification: MIL-M-108913 (MU); April, 1982):

- o Contact between dichloro and water, metals (except nickel), alkaline materials, and some organics (e.g. propylene glycol) is to be avoided. Dichloro reacts with alcohols to form toxic vapors and liquids. Use of alcohol in the area is avoided.
- o Spills on porous surfaces (concrete, wood, plastic, etc.) should be cleared and neutralized immediately, otherwise dichloro will be absorbed and become a hazard. All spills must be contained e.g., by covering with vermiculite, diatomaceous earth, clay or fine sand followed by soda ash, slaked lime, limestone or sodium bicarbonate. All materials and any contaminated soil or substrate will be removed and placed in a fully contained drum with a high density polyethylene liner. Drums will be labelled as hazardous and containing extremely corrosive material as per IAW, EPA and DOT requirements.
- o Special protective clothing will be worn when dichloro is present. The following precautions must be taken:
 - For concentrations of dichloro at or less than 100 ppm, full facepiece and (1) cml cartridge respirator and acid gas canister; or (2) supplied air respirator in positive pressure or continuous flow mode are used. For known concentrations exceeding 100 ppm or during emergencies, use self contained breathing apparatus (SCBA) with full facepiece operated in positive pressure mode.
 - Adequate ventilation is to be provided in the working and storage areas.
 - Acid resistant butyl rubber, PVC or neoprene gauntlet are used as protective gloves.
 - Industrial plastic face shield and chemical goggles are used for eye protection.

- Full protective impervious clothing including acid resistant apron or overalls and boots are to be used in the cleanup and transferring operations.
- o Special precautions must be taken in handling and storing dichloro. The following precautions must be taken:
 - Store dichloro in lead carboys with wax, in high density polyethylene bottles or nickel lined containers in well ventilated areas.
 - Avoid storage in metal containers (except nickel), since the hydrolysis product corrodes metals to give flammable/explosive gases.
 - Avoid using sparking tools around dichloro containing tanks and pipes.
 - Showers, eye-wash stations and personnel cleanliness facilities are to be provided. Wash hands before meals and at the end of the workday and avoid smoking, eating or drinking at the work site.
- o Special precautions must be taken in the transportation of dichloro. The following precautions must be observed:
 - Shipping in cargo vessels regulation IAW 49 CFR 173.63(b) must be followed.
 - Dichloro is limited to 1 quart per package when transported by cargo or passenger carrying aircraft, or passenger carrying vehicle. It must be shipped in lead carboys with wax, high density polyethylene bottles or nickel lined containers.

Deficiencies

The following deficiencies were noted at this tank farm:

- o The concrete containment pit is not a suitable containment material because if dichloro hydrolyzes with water (precipitation) it will

decompose to form hydrochloric and methyl phosphonic acids. These acids are highly reactive with cement and will effectively dissolve the concrete.

- o The following problems were observed in the containment pits:
 - Construction joints between the floor slab, outer containment wall, tank footings, and vertical construction joints in the outer containment wall. Vegetation growth is present in some joints indicating gaps which would result in leakage.
- o No containment or diversionary structures exist at the loading/unloading area.
- o Incompatible materials of tank construction with contents stored (Some tanks are severely deteriorated. However, RMA is in the process of reclaiming these tanks).
- o No gate valves or shutoff devices in the storm drain runoff to prevent the spill from entering the unnamed intermittent tributary of First Creek.
- o Lack of pumping system to remove precipitation from the containment pit.

3.3.2.3 Tank 1510

Physical Description

Tank 1510 is an aboveground tank located in the North Plant area, southeast of Building 1501 (see Figure 3). The tank is 40 feet in diameter by 10 feet high and is mounted on a 44 foot diameter concrete slab on grade. The capacity of this tank is 200,000 gallons. It contains fuel oil which supplies the incinerator and boilers in the North Plant. The tank was constructed of welded steel plates.

Surrounding the tank is an earthen berm composed of fine-grained soil material. The berm has no vegetation and is highly eroded with the most severe erosion on the north side. It is about 1 to 2 feet wide with a

rounded top and flat slopes. The west side of the berm is approximately 1 foot above the ground surface and on the north side it is approximately 5 feet above the ground surface. To the north, outside of the berm, is a drainage ditch which leads to the east and towards the Health Clinic Building. This tank may be filled through two small pipes that run underground from the fuel station which is located to the southwest of the tank. Two outlet pipes located on the north side of the tank, run into a concrete pipe trough located west of the tank. One pipe runs to the north to Tank Farm 1403 and the other pipe runs to the south up to the fuel station.

There are no high fluid level alarms or automatic shutoff devices present. A volume indicator is constructed within the tank to monitor the fluid level. The volume level indicator can be read at ground surface. There is fire protection utilities at this tank (see Table 2).

Spill Containment System

The containment structure surrounding the tank is an earthen berm. The berm is about 10 feet wide at the base, 2 feet wide at the top and 1-2 feet high. The structure is severely eroded particularly on the north side.

The top inside dimensions of the berm are 96 feet wide by 96 feet long and the bottom inside dimensions are 84 feet wide by 84.5 feet long. The berm was measured and surveyed with a hand level, rod and tape measure to determine the dimensions and containment capacity. The following presents the dimensions and capacity of the berm surrounding the tank:

TANK IDENTI- FICATION	BERM AREA			MINIMUM BERM HEIGHT (ft)	VOLUME (cf)	VOLUME (gallons)
	TOP (sf)	BOTTOM (sf)	AVERAGE (sf)			
1510	9,101	7,081	8,091	0.8	6,473	48,000

The earthen berm surrounding Tank 1510 will not fully contain the maximum capacity of the tank. If a spill did occur, the contents would flow over the northeast corner and north side (low points on the berm) of the berm into a drainage ditch that flows towards the Health Clinic Building.

The loading/unloading area for this tank is the same as for Tank Farm 1403 which was described in Section 3.3.2.1. The pipeline from the loading/unloading area to the tank is underground.

An underground pipeline connects Tank 1510 to the incinerator in Building 1611 and Buildings 1703, 1711 and 1712. These pipes were not inspected. No containment or diversionary structures are associated with them. Leakage in the pipeline that reached the surface would enter an unnamed, intermittent tributary to First Creek.

Spill History

A reportable spill has occurred at Tank 1510 as described below:

- o Date and Time of Discovery: 10 April 1982, 1000 hours (MST).
- o Severity of Incident: The incident was a minor spill of fuel oil.
- o Location of Incident and Specific Areas Affected by Spill: The spill was located along the south-east sides of Buildings 1703, 1711 and 1712 at RMA in the SE 1/4, Section 25, Township 25, Range 67W of the 6th Principal Meridian, Adams County, State of Colorado. The area affected by the spill included the ground near Buildings 1703, 1711 and 1712 plus the uppermost portion of an unnamed, intermittent tributary to First Creek.
- o Cause and Source of Incident: The spill was caused by the failure of an underground metallic pipe used for the transfer of fuel oil from Tank 1510 to Buildings 1611, 1704, and 1712. The pipe failed because of corrosion.

- o Type and Estimated Amount of Pollutant: The spill consisted of fuel oil. The quantity of fuel oil spilled was estimated at not less than 500 gallons and not more than 1,000 gallons.
- o Damage Impact on Surroundings: The spill resulted in the contamination with fuel oil of: (1) the ground around the pipeline, (2) the uppermost portion of an unnamed, intermittent tributary to First Creek, and (3) the floor of Building 1711.
- o Corrective Action to Eliminate Pollution Source: Corrective actions taken to limit the potential for a spill were as follows:
 - Stopping the flow of fuel oil into the failed pipe by closing the valve at Tank 1510.
 - Blocking the unnamed, intermittent tributary to First Creek.
 - Placing into barrels the fuel oil which ponded on the ground surface.
 - Removing with absorbent material the remaining fuel oil ponded on the ground surface.
 - Removing with absorbent material the fuel oil on the floor of Building 1711.
- o Remedial Action to Remove Pollutant: Remedial actions to remove the pollutant consisted of the removal and replacement of the underground pipe which failed plus the removal and replacement of the soil contaminated with fuel oil.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and total quantity of fuel oil which could be discharged from Tank 1510 as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Fuel Oil	Ruptured tank	200,000	Dependent on the rupture size	To the north	Containment of 48,000 gallons only
Fuel Oil	Spill or overflow during loading/unloading	Dependent on discharge rate and quantity in the tanker	Dependent on discharge rate and quantity in the tanker	To the south and east at the refueling station	None
Fuel Oil	Pipeline rupture	200,000	Dependent on rupture size	To the east	None, flow would enter into unnamed tributary to First Creek.

Inspection Procedures

The inspection procedures for Tank 1510 are described in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at Tank 1510:

- o The berm is constructed of fine grained soils that will temporarily contain a spill, but the soils are not sufficiently impervious to prevent seepage and contamination of the berm and containment area soil will occur.

- o The berm is eroded and will not fully contain the maximum capacity of the tank.
- o No containment or diversionary structures exist at the loading/unloading area.

3.3.2.4 Tank Farm 1505

Physical Description

Tank Farm 1505 is located in the North Plant area, west of Building 1601 (see Figure 3). It contains 10 metal tanks mounted horizontally on concrete piers in two rows. The capacity of each tank is 18,000 gallons and the total capacity is 180,000 gallons. The tanks contain caustic (sodium hydroxide) which is used as a neutralizing agent in demilitarization processes. The tanks were constructed in 1951 of carbon steel plates.

Surrounding this tank farm is a gravel berm that has been severely eroded. The structure is divided into two compartments, each containing 5 tanks. There are prairie dog holes, gulleying and vegetation growth on all sides of the structure. The common berm, dividing the eastern and western compartments, is approximately 1 foot high and 12 feet wide at the top. The eastern berm is extremely deteriorated and basically non-existent. The northern berm is also deteriorated but not as severely as the eastern berm. The south and west sides of the berm are cuts into the adjacent hillside approximately 8 feet high. The floor of both compartments is gravelly soil.

There are no high fluid level alarms, automatic shutoff devices or gauges on these tanks. There is fire protection utilities at this tank farm (see Table 2).

Spill Containment System

The ground surface slopes away from these tanks at approximately 4 to 8 percent to the east and southeast. The eastern containment compartment is extremely deteriorated. For all practical purposes there is no

secondary containment for the eastern 5 tanks. The western compartment is in poor condition also. The following presents the approximate dimensions and capacity of the western containment compartment:

TANK IDENTI- FICATION	BERM AREA			MINIMUM BERM HEIGHT (ft)	VOLUME (cf)	VOLUME (gallons)
	TOP (sf)	BOTTOM (sf)	AVERAGE (sf)			
Western- Compartment 1505	3,800	2,100	2,950	0.7	2,070	15,000

An accidental spill in the eastern compartment would not be contained due to the extreme deterioration of the berm. The contents would flow to the east and southeast across the ground and gravel road and accumulate in the storm runoff collection ditches. The ditches are interconnected and flow to the north into catchment basins within the system. If all tanks emptied (in both compartments), discharge could overflow the catchment basin and enter Sand Creek Lateral.

The western containment compartment will not fully contain the maximum capacity of the largest single tank. If a spill did occur, the contents would flow to the east and southeast across the ground and gravel road as described above.

Two loading/unloading areas are associated with Tank Farm 1505 as follows:

- o Pipeline system from the railroad tracks to the tank farm.
- o Tank truck loading/unloading system at the tank farm.

The pipeline is an aboveground system that traverses upgrade to the tank farm from the loading area. It is located southeast of the tank farm at

the railroad tracks. No containment or diversionary structures are associated with this pipeline. The ground surface slopes to the east and southeast around the pipeline. An accidental spill along the pipeline would flow in a southeasterly direction and accumulate at the ditch near the loading/unloading facility. The pipeline has two main shutoff devices; one is located at the loading station and the other at the tank farm. Several drain off valves constructed within the pipeline system are used to drain the system if a break in the pipeline is detected.

The area around the loading/unloading facility at the railroad tracks is essentially flat. No containment or diversionary structures are present except for a ditch on the west side of the tracks. An accidental spill would accumulate within this ditch or spill on the level ground surface near the railroad tracks.

The second loading/unloading area is in the vicinity of the tank farm. As previously mentioned, this area slopes to the east and southeast. The loading/unloading area is located on the east side of the tank farm. No containment or diversionary structures are present at this facility. An accidental spill would flow to the east along the gravel road and accumulate in the ditch near the railroad tracks.

Spill History

No reported spills have occurred from Tank Farm 1505.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and total quantity of caustic which could be discharged from Tank farm 1505 as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Caustic	Ruptured Tank in Eastern Compartment	18,000	Dependent on rupture size	To the east and south-east	None
Caustic	Ruptured tank in western Compartment	18,000	Dependent on size of rupture	To the east and south-east	Containment of 15,000 gallons
Caustic	Spill or overflow during loading/unloading	Dependent on discharge rate, quantity being transferred	Dependent on discharge rate	At tank farm: To the east and south-east. At pipeline: Accumulate near the railroad tracks.	None at the eastern structure. Partial containment at the western structure.
Caustic	Ruptured pipeline	Dependent on discharge rate, quantity being transferred	Dependent on discharge rate	To the east and southeast	None

Inspection Procedures

The inspection procedures are discussed in detail in Section 3.2.1.

Operating Procedures and Information

In addition to the operating procedures and information discussed in Section 3.2.2, the following precautions also apply:

- o Because caustic is a strong base, it reacts violently with acids and is corrosive towards aluminum and zinc. Use of acids and aluminum or zinc in the area is avoided.
- o Caustic reacts with light metals forming hydrogen. Caustic reacts violently with halogenated hydrocarbons. Use of these substances in the area is also avoided.
- o The substance is corrosive to the eyes, skin and respiratory tract. Protective goggles and clothing are used when working with caustic.
- o In case of spillage, large quantities of water are added to dilute it.
- o Hazardous materials must be stored and transported in Department of Transportation (DOT) approved shipping containers. Both the containers and the transporting vehicles must be properly labeled in accordance with DOT, NEPA, and hazardous or toxic materials and waste standards.

Deficiencies

The following deficiencies were noted from Tank Farm 1505:

- o No containment structure exists for the eastern 5 tanks.
- o The western containment structure will not fully contain the maximum capacity of the single largest tank.
- o The berms are composed of gravelly material with prairie dog holes and gullaying evident.
- o The containment area floor is gravelly soil which is not sufficiently impervious to prevent seepage and contamination will occur.
- o No containment or diversionary structures exist at the loading/unloading areas.
- o No fail-safe engineering designs exist such as high fluid alarms, automatic shutoff devices on gauges to monitor the fluid level.

3.3.2.5 Day Tank South of Building 1611

Physical Description

This tank is an aboveground tank located in the North Plant area, south of Building 1611 (see Figure 3). The tank contains fuel oil and is used as a daily supply tank for Building 1611. The capacity of the tank is 4,500 gallons and it was constructed of welded carbon steel plates.

The tank is contained by a sump consisting of a concrete slab at grade and concrete side walls. The concrete is in good condition. The tank is elevated approximately 3 feet from the bottom of the slab. Located at the bottom southeast corner of the structure is a drain valve that can be used to drain the sump. There is a permanent ladder constructed on the northeast side of the tank to inspect the condition of the tank and monitor the fluid level. Minimal fire protection is provided at this tank (see Table 2).

No high fluid level or automatic shutoff devices are present in this tank. A fluid level indicator may be constructed within this tank up on the top portion of the tank in a locked metal box. However, an alternate means of monitoring the fluid level with a dip stick that is located near the tank in the sump.

Spill Containment System

The area around this tank slopes at approximately 1 to 2 percent to the east towards First Creek. The concrete sump containment structure has sidewalls 10 inches thick and 1.5 feet high. In plan, the sump is 19 feet wide by 19 feet long. Containment capacity is 790 cubic feet or approximately 5,900 gallons. The concrete sump would fully contain the contents of the tank.

Based on information supplied by RMA, the day tank can be supplied by Tank Farm 1403 which contains 244,000 gallons of fuel oil or Tank 1510,

which contains 200,000 gallons of fuel oil. As of April 1983, Tank Farm 1403 was not being used to supply the day tank with fuel. When the fuel in the day tank is lowered to a specific level, the automatic supply line is activated. The automatic supply line is activated by a high/low switch in the system and the fuel is transferred by a gravity pump into the day tank. Tank 1510 is the primary supply tank for the day tank. If a rupture in the day tank occurred, the fluid level would be lowered to the point where the supply system would be activated. If the entire supply of Tank 1510 also discharged, an extremely large spill would occur and flow to the east and southeast and enter into First Creek. A similar spill would occur if the day tank was being supplied by Tank Farm 1403.

Spill History

A reportable spill has occurred at this tank. Information available concerning this spill follows:

- o Date: August 15, 1981.
- o Location of the Incident: Day tank on south side of Building 1611.
- o Cause of the Incident: Equipment failure.
- o Type and Estimated Amount of Pollutant: The spill consisted of No. 2 fuel oil. The quantity of the fuel oil spill was 11,430 gallons.
- o Corrective Action: The spilled fuel oil and contaminated soil were removed. The equipment was repaired and a new concrete dike containment system for the tank was installed.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and total quantity of fuel oil which could be discharged from the tank as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Fuel Oil	Ruptured tank	4,500	Dependent on rupture size	None	Fully contained
Fuel Oil	Ruptured tank (with major supply tank)	204,500 (includes contents from tank 1510)	Dependent on rupture size	To First Creek	Containment of 5900 gallons.
Fuel Oil	Spill or overflow during loading/unloading	204,500 (includes contents from tank 1510)	Dependent on discharge rate	To First Creek	Containment of 5900 gallons.

Inspection Procedures

The inspection procedures for this tank are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at this tank:

- o No containment or diversionary structures at or near First Creek to prevent an accidental discharge from entering the waterway.
- o Need manual discharge (feed valves) at Tank Farm 1403 and Tank 1510 to operate the flow (open or close) of the fuel oil into this tank.

3.3.2.6 Day Tank North of Building 1611

Physical Description

This tank is an aboveground tank located in the North Plant area, north of Building 1611 (see Figure 3). This tank contains fuel oil and is used as a daily supply tank for Building 1611. The capacity of the tank is 1500 gallons and it was constructed of welded carbon steel plates.

The tank is contained by a concrete sump with a slab at grade and walls. The walls are in fair condition with some minor cracking. The floor of the containment structure is severely spalled. The tank sits on a circular concrete footing approximately 2 feet thick, which places the bottom of the tank at the same elevation as the top of the sump. Located at the bottom of the northeast corner of the structure is a drain valve that can be used to drain the sump. There are oil stain-marks on the concrete walls above the floor which may indicate past spills.

No high fluid level or automatic shutoff devices are present in this tank. There does not appear to be volume level indicator constructed within this tank to monitor the fluid level. Minimal fire protection is provided at this tank (see Table 2).

Spill Containment System

The area around this tank slopes slightly northeast at approximately 1 percent towards First Creek. The concrete sump containment structure has sidewalls 10 inches thick and 2 feet high. In plan, the sump is 14 feet wide by 14 feet long. Containment capacity is 390 cubic feet or approximately 2,900 gallons. The sump would fully contain the contents of the tank if an accidental spill occurred.

Based on information supplied by RMA, this day tank can be supplied by Tank Farm 1403 which contains 244,000 gallons of fuel oil or Tank 1510,

which contains 200,000 gallons of fuel oil. As of April 1983, Tank Farm 1403 was not being used to supply the day tank with fuel. When the fuel level in the day tank is lowered to a specific level, the automatic supply line is activated. The automatic supply line is activated by a high/low switch in the system and the fuel is transferred by a gravity pump into the day tank. Tank 1510 is the primary supply tank to this facility. If a rupture in the day tank occurred, the fluid level would be lowered to the point where the supply system would be activated. This could produce an extremely large spill that would flow to the east and discharge into First Creek. A similar spill would occur if the day tank was being supplied by Tank Farm 1403.

Spill History

No reported spills have occurred at this tank.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and the total quantity of fuel oil which could be discharged from the tank as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Fuel Oil	Ruptured tank	1,500	Dependent on rupture size	None	Fully contained
Fuel Oil	Ruptured tank (with major supply tank)	201,500 (includes contents from Tank 1510)	Dependent on the size of the rupture	To the northeast (possibility of entering First Creek)	Containment of 2,900 gallons.

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Fuel Oil	Spill or overflow during loading/ unloading	201,500 (includes contents from Tank 1510)	Depend- ent on discharge rate	To the northeast (possibil- ity of entering First Creek)	Containment of 2,900 gallons.

Inspection Procedures

The inspection procedures for this tank are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at this tank:

- o Concrete floor of the containment sump is severely spalled at the surface and at depth.
- o No containment or diversionary structures at or near First Creek to prevent an accidental discharge from entering the waterway.
- o Need a manual discharge (feed valves) at Tank Farm 1403 and Tank 1510 to operate the flow (open or close) of fuel oil into this tank.

3.3.3 Container Storage Area

The Container Storage Area is located in the eastern central portion of RMA (see Figures 1 and 4). A mobile refueling station described below is located in this area.

3.3.3.1 Mobile Refueling Station

Physical Description

This facility is a mobile refueling station which contains 1 above ground 500 gallon diesel tank and 1 aboveground 500 gallon gasoline tank. The tanks are located near the Container Storage Area (see Figure 4). These carbon steel tanks are supported above the ground surface on steel tank racks. The tanks can be moved as required to other locations.

No high fuel alarms or automatic shutoff devices are present in these tanks. A fluid level indicator constructed within the tanks is used to monitor the fluid level. Minimal fire protection is provided at these tanks (see Table 2).

Spill Containment System

The area around these tanks slopes slightly at approximately 1 percent to the northeast and then to the north. Presently, no containment or diversionary structures are associated with these tanks or their loading/unloading area. An accidental spill would probably cause only minor problems because of the relatively small size of the tanks. Approximately 60 feet to the northeast of these tanks is a storm runoff collection ditch. An accidental spill would flow in the direction of the ditch and could enter First Creek if water was flowing through the ditch (e.g. after a storm).

Spill History

No reported spills have occurred at these tanks.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and the total quantity of diesel fuel or gasoline which could be discharged from the tank as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Diesel fuel	Ruptured tank	500	Depend- ent on rupture size	To the north, and north- east	None
	Spill on overflow during loading/ unloading	Depend- ent on discharge rate and quantity of tank trucks	Depend- ent on discharge rate	To the north and north- east	None
Gasoline	Ruptured tank	500	Depend- ent on rupture size	To the north and north- east	None
	Spill or overflow during loading/ unloading	Depend- ent on discharge rate and quantity of refuel- ing vehicle	Depend- ent on discharge rate	To the north and north- east	None

Inspection Procedures

The inspection procedures are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at the mobile refueling station:

- o No containment or diversionary structures.

- o No containment or diversionary structures at the loading/unloading area.

3.3.4 South Plant Area

The South Plant area is located in the southern central portion of RMA (see Figures 1 and 5). The tanks discussed in the following sections are located in this area.

3.3.4.1 Tank Farm 745 A, B, and C

Physical Description

This tank farm contains 3 aboveground tanks located in the South Plant area, north of Building 742 (see Figure 5). The tanks contain diesel fuel that supplies the auxillary boilers in the South Plant area. The tanks were constructed of welded steel plates. The exterior of the tanks appear to be in fair to good condition with only minor surface rust.

Earthen berms surround each tank. The berms have been eroded and are rounded on top and are about 3 to 6 feet across with gentle side slopes. The interior of the basins are partially filled in by eroded berm material. The berms are composed of fine grained soil with no gravel or erosion protection. Some vegetation growth is present in the interior basin and on the side slopes.

No high fluid level alarms or automatic shutoff devices are present in these tanks. There is a metal ladder access to the top of each tank. A volume level indicator is constructed within each tank, however they appear to be inoperable. Minimal fire protection is provided at these tanks (see Table 2).

The following are the tank dimensions and capacities for Tank Farm 745A, B and C:

TANK IDENTIFICATION	DIMENSIONS	MAXIMUM CAPACITY (GALLONS)
745A	25' diameter by 33'-2" high	113,850
745B	25' diameter by 33'-2" high	113,850
745C	33' diameter by 33'-2" high	200,000

The tanks are located on the ground with no constructed foundation that would provide protection against corrosion.

Spill Containment System

The area around this Tank Farm grades slightly at approximately 1 percent to the south. Each tank is surrounded by an earthen berm that has been eroded. Each of the berms were surveyed with a hand level, rod and tape measure to determine the dimensions and capacities of the berms. The following presents the dimensions and capacity of the berms surrounding each tank:

TANK IDENTI- FICATION	BERM AREA			MINIMUM BERM HEIGHT (ft)	VOLUME (cf)	VOLUME (gallons)
	TOP (sf)	BOTTOM (sf)	AVERAGE (sf)			
745 A	5,688	3,286	4,487	1.4	6,282	47,000
745 B	6,545	3,584	5,065	1.1	5,571	42,000
745 C	10,920	6,615	8,768	1.1	9,644	72,000

The containment structures will not fully contain the maximum capacity of each tank. If a spill did occur, the contents would spill over the south side of the berm (lowest point on the berms). An accidental spill

would flow into the storm runoff drain (grated opening) located approximately 25 feet from the south side of Tank 745B. The drain runs into a series of catchment basins that are constructed along the south side of the tanks. A spill would pond in the catchment basins.

Loading/unloading can take place at the following two locations near the tanks:

- o At Building 744A on the north side of the tanks by railroad tank cars and,
- o On the south side of the tanks by tank truck.

Building 744A is a pump house which loads and unloads fuel from railroad tank cars. The area is essentially flat and an accidental spill would tend to accumulate in the low portions along the railroad tracks.

The second loading/unloading facility is on the south side of the tanks and is used by tank trucks. The area grades at approximately 2 percent to the south. An accidental spill of the contents of a truck would flow into the storm runoff drain located on the south side as discussed above.

Spill History

No reported spills have occurred at these tanks.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and the total quantity of diesel fuel which could be discharged from the tanks as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Tank 745A Diesel Fuel	Ruptured tank	113,850	Depend- ent on rupture size	To the south	Contain- ment of 47,000 gallons
Tank 745B Diesel Fuel	Ruptured tank	113,850	Depend- ent on size of rupture	To the south	Contain- ment of 42,000 gallons
Tank 745C Diesel Fuel	Ruptured tank	200,000	Depend- ent on size of rupture	To the south	Contain- ment of 72,000 gallons
Diesel Fuel	Spill or overflow during loading/ unloading	Depend- ent on quantity being transferred	Depend- ent on discharge rate	At 744A: accumula- tion along tracks South side: into the storm sewer drains	None at 744A .. Into the catchment basins in storm runoff system.

Inspection Procedures

The inspection procedures are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at these tanks:

- o The berms are constructed of fine grained soils which will temporarily contain spills, but the soils are not sufficiently impervious to prevent

seepage and contamination of the berm and containment area soils will occur.

- o The containment structures surrounding each of the tanks will not fully contain the tank capacity.
- o No constructed foundations exist under the tanks that would provide protection against corrosion.
- o No containment or diversionary structures exist at the loading/unloading areas.
- o No fail-safe engineering designs exist such as high fluid alarms or gauges to monitor fluid levels.

3.3.4.2 Mobile Refueling Station

Physical Description

The mobile refueling station consists of 2 aboveground 55 gallon gasoline drums and 1 aboveground 300 gallon diesel tank. These tanks are supported above the ground surface on steel tank racks. The tanks are located in the South Plant area in the south parking lot of Building 729 (see Figure 5). The large tank was constructed of carbon steel and the small tanks of steel. These tanks can be transported to other locations as required.

No high fluid alarms or automatic shutoff devices are present in these tanks. A visual fluid level indicator is constructed within the 300 gallon diesel tank. The 55 gallon drums do not contain any monitoring devices. Minimal fire protection is provided at these tanks (see Table 2).

Spill Containment System

Because of the slight (less than one percent) gradient, the area around these tanks is essentially flat. No containment or diversionary structures are associated with the tanks and their related loading/unloading areas. An accidental spill of contents would tend to accumulate in the parking lot.

Spill History

No reported spills have occurred at these tanks.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and the total quantity of gasoline or diesel fuel which could be discharged from the tanks as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Diesel Fuel	Ruptured tank	300	Dependent on the size of the rupture	Ponding of contents in parking lot	None
	Spill overflow during loading/unloading	Dependent on discharge rate	Dependent on discharge rate	Ponding of contents in parking lot	None
Gasoline	Ruptured tank	55	Dependent on rupture size	Ponding of contents in parking lot	None
	Spill on overflow during loading/unloading	Dependent on discharge rate	Dependent on discharge rate	Ponding of contents in parking lot	None

Inspection Procedures

The inspection procedures are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at these tanks:

- o No containment or diversionary structures surrounding the tanks.
- o No containment or diversionary structures exists at the loading/unloading area at these tanks.
- o No monitoring devices are present in the 55 gallon drums.

3.3.4.3 Tank Farm 321 A, B and EPhysical Description

Tank Farm 321 is comprised of 3 aboveground tanks, Tanks 321A, B and E, located in the South Plant area, east of Building 244 (see Figure 5). Tank 321A is on the east, 321B on the west and 321E on the north, in Figure 5. These tanks contain fuel oil that is used for the heating plant in Building 321. The tanks were constructed of welded steel plates. The following are the dimensions and capacities of these tanks:

TANK IDENTIFICATION	DIMENSIONS	MAXIMUM CAPACITY (GALLONS)
321A	24'-6" diameter by 20'-6" high	72,000
321B	23' diameter by 20'-6" high	64,000
321E	44'-6" diameter by 34'-6" high	416,000

The tanks are located on soil with no constructed foundations that would provide protection against corrosion. Minimal fire protection is provided at these tanks (see Table 2). There are earthen berms surrounding each tank for secondary containment. The tanks are equipped with steam coils to reduce the viscosity of the fuel oil to a pumpable condition. A ladder provides access to the tank roof and to a flame arrestor mounted thereon. An automatic tank gauge is also attached. The external condition of these tanks are in good condition.

Spill Containment System

The containment structures surrounding the tanks are earthen berms composed of fine grained soil. Each of the berms were surveyed and measured with a hand level, rod and tape measure to determine the dimensions and capacities. The following presents the dimensions and capacity of the berms surrounding the tanks:

TANK IDENTI- FICATION	BERM AREA			MINIMUM AVERAGE HEIGHT (ft)	BERM VOLUME (cf)	VOLUME (gallons)
	TOP (sf)	BOTTOM (sf)	AVERAGE (sf)			
321A	4,032	2,310	3,171	2.2	6,976	52,000
321B	3,640	2,420	3,030	2.2	6,666	50,000
321E	14,175	10,502	12,338	2.49	30,722	230,000

The earthen berms surrounding Tanks 321A, B and E will not fully contain the maximum tank capacity. Tanks 321A and 321B have a common berm between them. If an accidental spill did occur at these tanks, the contents would flow over the north end of the common berm, i.e., the northwest corner of the berm at Tank 321A and the northeast corner of the berm at Tank 321B. The contents would accumulate along the ground on the north side of these tanks.

If an accidental spill did occur at tank 321E, the contents would flow over the southeast corner of the berm and accumulate along the ground on the south side of the tank.

Spill History

No reported spills have occurred from these tanks.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and the total quantity of fuel oil which could be discharged from the tanks as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Tank 321A Fuel Oil	Ruptured tank	72,000	Depend- on the rupture size	To the northwest	Containment of 52,000 gallons
Tank 321B Fuel Oil	Ruptured tank	64,000	Depend- ent on rupture size	To the north- east	Containment of 50,000 gallons
Tank 321E Fuel Oil	Ruptured Tank	416,000	Depend- ent on the rup- ture size	To the south- east	Containment of 230,000 gallons
Fuel Oil	Spill or overflow during loading/ unloading	Depend- ent on discharge rate	Depend- ent on discharge rate	To the southeast at Tank 321E. To the north- east at Tank 321 B.	None

Inspection Procedures

The inspection procedures are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at these tanks:

- o The berms which are constructed of fine grained soils which will temporarily contain spills, but the soils are not sufficiently impervious to prevent seepage and contamination of the berms and containment area soil would occur. The berms are also eroded.
- o The containment structure for each tank will not contain the maximum tank capacity.
- o There are no containment structures or diversionary structures at the loading/unloading area for this facility.
- o There are no constructed foundations under these tanks that would provide protection against corrosion.

3.3.4.4 Mobile Refueling StationPhysical Description

This mobile refueling station consists of 4 aboveground tanks, located in the South Plant area, south of Building 544 (see Figure 5). The station consists of 2 aboveground 300 gallon tanks on steel racks, 1 1,500 gallon gasoline tank, and 1 1,000 gallon diesel tank on concrete supports. These steel tanks can be moved as necessary.

No high fluid alarms or automatic shutoff devices are present in these tanks. A visual fluid level indicator constructed within each of these tanks is used to monitor the fluid level. Minimal fire protection is provided at these tanks (see Table 2).

Spill Containment System

The area around the tanks is essentially flat. No aboveground containment or diversionary structures exist around the tanks and their related loading/unloading areas. If an accidental spill did occur the contents would tend to accumulate in the gravel parking lot.

Spill History

No reported spills have occurred from these tanks.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and the total quantity of diesel fuel and gasoline which could be discharged from the tanks as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Diesel Fuel	Ruptured tank	1000	Depend- ent on the size of the rupture	Ponding of contents in parking lot	None
	Spill or overflow during loading/ unloading	Depend- ent on discharge rate	Depend- ent on discharge rate	Ponding of contents in parking lot	None
Gasoline	Ruptured tank	1500	Depend- ent on rupture size	Ponding of contents in parking lot	None

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
	Spill or overflow during loading/ unloading	Depend- ent on discharge rate	Depend- ent on discharge rate	Ponding of contents in parking lot	None
Gasoline	Ruptured tank	300	Depend- ent on rupture size	Ponding of contents in parking lot	None
	Spill or overflow during loading/ unloading	Depend- ent on discharge rate	Depend- ent on discharge rate	Ponding contents in parking lot	None
Gasoline	Ruptured tank	300	Depend- ent on rupture size	Ponding of contents in parking lot	None
	Spill or overflow during loading/ unloading	Depend- ent on discharge rate	Depend- ent on discharge rate	Ponding contents in parking lot	None

Inspection Procedures

The inspection procedures are discussed in detail in Section 3.2.1.

Operating Procedures and Information

The operating procedures and information are discussed in detail in Section 3.2.2.

Deficiencies

The following deficiencies were noted at these tanks:

- o No containment or diversionary structures surrounding the tanks.
- o No containment or diversionary structures exists at the loading/unloading area.

3.3.4.5 Building 742

Physical Description

Building 742 is located in the South Plant area (see Figure 5). The following three rooms located in the building are of concern:

- o Mixing room
- o Insecticide storage room
- o Pesticide storage room

The storage and mixing rooms have poured concrete floors and drain blocks. The drain blocks are 6 inch high poured concrete blocks at the doorways. The insecticides and pesticides are stored on wooden pallets off the floor. Some are also stored in locked metal cabinets. Container size ranges from 250 ml to one gallon for liquids. Powders are stored in five gallon cans.

Spill Containment System

No drainage is associated with the mixing and storage rooms. All of the rooms have poured concrete floors and drain blocks for containment of any spill which could occur. An accidental spill would be fully contained within these rooms.

The bulk loading/unloading is performed on an asphalt pad near Building 544 (see Figure 5). No aboveground containment or diversionary structures are present at this location. However, because of the small quantities a spill would probably not flow off of the asphalt pad.

Spill History

No reported spills have occurred at this site.

Potential Spills

The following indicates potential types of equipment failure and a prediction of the direction, rate of flow and total quantity of the insecticide or herbicide which could be discharged as a result of each major type of failure:

<u>CONTENTS</u>	<u>MAJOR TYPE OF FAILURE</u>	<u>POTENTIAL TOTAL QUANTITY (GAL)</u>	<u>RATE OF FLOW</u>	<u>DIRECTION OF FLOW</u>	<u>SECONDARY CONTAINMENT</u>
Insecti- cide of herbicide	Broken container in Build- ing 742	Depend- ent on container size	None	None	Fully contained
Insecti- cide or herbicide	Spill or overflow during loading/ unloading	Depend- ent on discharge rate	Depend- ent on discharge rate	To the north and east (culverts)	None

Inspection Procedures

Visual inspections of the concrete floors and drain blocks for deterioration are conducted on a monthly basis. Containers are inspected as they are received and before use to ensure that they are intact.

Operating Procedures and Information

In order to properly handle an insecticide or herbicide spill, spill kits containing directions for use have been prepared. The kits are labeled, listing the contents, and designated for use in handling pesticides or herbicide spills only. The kits are strategically placed where spills are most likely to occur. The kits are sealed. Table 3 presents a list of equipment that is found in all shop and vehicle spill kits.

Depending on the particular pesticide, chlorine bleach, caustic soda (lye, sodium hydroxide) or lime can be used to effectively decontaminate most spills. Many pesticides, especially the organophosphate pesticides, decompose when treated with lye or lime. Fewer pesticides are decomposed by bleach (sodium hypochlorite). Other pesticides which cannot be effectively decontaminated by the above procedures are treated with only detergent and water. The residues are then drained to the wastewater treatment tank. Table 4 presents examples of common pesticides and the means for decontamination.

Deficiencies

The following deficiencies were noted at this facility:

- o No containment or diversionary structures exists at the loading/unloading area.

4.0 INSTALLATION SPILL CONTINGENCY (ISC) PLAN

4.1 INTRODUCTION

U.S. Army Regulation AR 200-1, Section 8-9 and 40 CFR § 112.7(d)(1) requires the development and implementation of an Installation Spill Contingency (ISC) Plan as a part of the SPCC Plan. The purpose of the contingency plan is to provide for timely, efficient, coordinated and effective action to minimize damage resulting from any oil and/or hazardous substance spills. Information was obtained from (RMA, 1983a) for the development of this plan. The ISC Plan applies to the following potential spills sources at RMA:

LOGISTIC AREA (see Figure 2)

- o Tank 632
 - 1 underground 40,000 gal. diesel tank
- o Tank CARM 10716
 - 1 underground 1,000 gal. waste oil tank
- o Motor Pool Service Station
 - 1 underground 9,000 gal. diesel tank
 - 2 underground 12,000 gal. gasoline tanks
- o Tank Farm 629A-D, 628A, and 648A and B
 - 5 aboveground 10,000 gal. diesel tanks
 - 2 aboveground 10,000 gal. asphalt and road oil tanks

NORTH PLANT AREA (see Figure 3)

- o Tank Farm 1403
 - 13 aboveground 18,000 gal. fuel oil tanks
 - 1 aboveground 10,000 gal. fuel oil tank
- o Tank Farm 1402
 - 24 aboveground 3,000 gal. methylphosphonic fluoride tanks
- o Tank 1510
 - 1 aboveground 200,000 diesel fuel tank

- o Tank Farm 1505
 - 10 aboveground 18,000 gal. caustic tanks
- o Day tank south of Building 1611
 - 1 aboveground 4,500 gal. diesel tank
- o Day tank north of Building 1611
 - 1 aboveground 1,500 gal. diesel tank

CONTAINER STORAGE AREA (see Figure 4)

- o Mobil Refueling Station
 - 1 aboveground 500 gal. diesel tank
 - 1 aboveground 500 gal. gasoline tank

SOUTH PLANT AREA (see Figure 5)

- o Tank Farm 745A, B and C
 - 2 aboveground 113,850 gal. diesel tanks
 - 1 aboveground 200,000 gal. diesel tanks
- o Mobile Refueling station
 - 1 aboveground 1,000 gal. diesel tank
 - 1 aboveground 1,500 gal. gasoline tank
 - 2 aboveground 300 gal. gasoline tanks
- o Tank Farm 321A, B and E
 - 1 aboveground 64,000 gal. fuel oil tank
 - 1 aboveground 72,000 gal. fuel oil tank
 - 1 aboveground 416,000 gal. fuel oil tank
- o Mobile refueling station
 - 2 aboveground 55 gal. gasoline tanks
 - 1 aboveground 300 gal. diesel tank
- o Building 742 (herbicides and pesticides)

4.2 RESPONSIBILITIES AND MOBILIZATION

The ISC Plan establishes the responsibilities, duties, procedures and resources to be employed to contain and cleanup accidental spills. Specific portions of this section include the following:

- o Definition of the authorities, responsibilities and duties of the Installation Response Team (IRT) in the planning or directing oil removal operations (Section 4.2.1).
- o Establishment of notification procedures for the purpose of early detection of an oil or hazardous substance spill (Section 4.2.2).

4.2.1 Installation Response Team (IRT)

The ISC Plan establishes the Installation Response Team (IRT) to be responsible for activities following a spill. The IRT defines the authorities, responsibilities and duties of all persons involved in planning or directing spill removal operations. The purpose of the IRT is to avoid unnecessary duplication of contingency planning activities and duties. The IRT acts as an emergency response team, performing response functions as directed by the Installation On-Scene Coordinator (IOSC). IRT responsibilities include the timely, efficient, coordinated and effective action to contain an accidental spill and minimize any damages.

Table 5 shows the organization of the IRT. Personnel on the IRT include, but are not limited to the following:

- o Installation On-Scene Coordinator
- o Facility Engineer
- o Buildings, Grounds and Utilities Branch
- o Chemist
- o Safety Manager and Health Clinic
- o Security Officer
- o Fire Prevention and Protection Representative
- o Supply Division
- o Equipment Management Office
- o Motor Maintenance Branch
- o Personnel at the Site

RMA's installation response operations center is located in Building 111.

4.2.1.1 Installation On-Scene Coordinator and Facility Engineer

The Installation On-Scene Coordinator (IOSC) is the official predesignated by RMA's Commander to coordinate and direct Army control and cleanup efforts at the scene of an accidental oil or hazardous substance spill on or adjacent to RMA. Upon notification of the accident/incident, the IOSC will notify the appropriate Divisions and Branches of the accident/incident.

The IOSC is responsible for activation of manpower and equipment (IRT) to contain and cleanup accidental discharges. The IOSC must determine the resources required to contain the spill and to cleanup spills that may reach navigable water. The IOSC is responsible for reporting of spills in accordance with Paragraph 8-11 of AR 200-1. All personnel assigned or employed by the Department of the Army will report any spills of oil or hazardous substances. These reports will be made to the IOSC. Any spills, of 1,000 gallons or more of Petroleum, Oil and Lubricants (POL) or reportable quantity of hazardous liquid substance, into navigable waters on or adjacent to an Army installation in the United States will be promptly reported by the IOSC to the National Response Center (NRC) or to the Coast Guard, to the EPA Regional Office, and electronically through channels to HODA (DAEN-ZCE), Washington, D.C. 20301. Detailed reporting procedures are discussed in Section 4.5 of this report.

The IOSC also predesignates a Public Affairs Officer to notify the proper agencies that a spill has occurred at RMA, and to maintain proper communication with any outside agencies (news media, reporters, fire department, etc.). The IOSC and alternates are listed below:

- o On-Scene Coordinator
James L. Green
Facilities Engineer
SARRM-ISF
(303) 289-0166
FTS 330-1166
AV 556-2166
- o 1st Alternate
Raymond A. Pimple
Chief, Fire Prevention Branch
SARRM-ISF-F
(303) 289-0192
FTS 330-1192
AV 556-2192
- o 2nd Alternate
Darrell G. Mack
Chief, Buildings, Grounds & Utilities Branch
SARRM-ISF-B
(303) 289-0412
FTS 330-1412
AV 556-2412

4.2.1.2 Buildings, Grounds and Utilities Branch

The IOSC will immediately notify the office of Buildings, Grounds and Utilities Branch and tenant organizations. The Buildings, Grounds and Utilities Branch are responsible for the following:

- o Assure that all engineer equipment team personnel are notified of the accident or incident and its location.
- o Assure that all personnel responding from the maintenance area have the proper safety equipment.
- o Determine that all serviceable vehicles in the maintenance area are fueled and checked for dispatch to the accident/incident scene.
- o Hold engineer equipment team in standby at Bldg. 543.

- o Notify tenants and organizations of the accident/incident.
- o Perform and conduct cleanup operations.
- o Provide equipment, including heavy equipment support required for cleanup of spills.

The Building, Grounds and Utilities Branch representative and alternate are listed below:

- o Primary
Darrell G. Mack
Chief, Buildings, Grounds and Utilities Branch
SARRM-ISF-B
(303) 289-0412
FTS 330-1412
AV 556-2412
- o Alternate
Joseph Stukes
SARRM-ISB
(303) 289-0410
FTS 330-1410
AV 556-2410

4.2.1.3 Chemist

The organic and/or analytical chemist assigned to the IRT recommends the procedures and techniques to be used to identify, sample, contain, disperse, reclaim and remove oil and hazardous substances at the spill area. The chemist is responsible for determining and reporting to the IOSC whether any potentially harmful situations and/or reactions may occur when containing or cleaning up the accidental discharge of oil or hazardous substances. The chemist provides information on the chemical properties of the spill material and the compatible products to be used in the containment and cleanup. Coordination with the IOSC provides for the safety of all personnel and the efficient containment and cleanup at the discharge site. The chemist and alternates are listed below:

- o Chemist
Eddie R. Jones
Chief, Analytical Systems Branch
SARRM-TOE
(303) 289-0201
FTS 330-1201
AV 556-2201
- o Alternate
Elijah G. Jones
SARRM-TOE-A
(303) 289-0196
FTS 330-1196
AV 556-2196
- o Alternate
Kirview W. Wicker
SARRM-TOE-A
(303) 289-0295
FTS 330-1295
AV 556-2295

4.2.1.4 Safety Manager and Health Clinic

The safety manager is responsible for the safety of the personnel working at the spill site. Responsibilities include the following:

- o Inspection of the site for potentially harmful situations (open flames near the discharge, etc.).
- o Use of proper safety equipment to contain the discharge.
- o Notification of the Health Clinic - 289-0278

The safety manager is listed below:

- o Safety Manager
Alma T. Harris
Acting Chief, Safety Office
SARRM-SF
(303) 289-0136
FTS 330-1136
AV 556-2136

The Health Clinic personnel are responsible for the following:

- o Notification of hospitals in the area.
- o Provision for emergency evacuation equipment at the site (ambulances).

The Health Clinic representative and alternate are listed below

- o Director of Health Service
Dr. Evan L. Lewis, M.D.
Director of Health Service
HSHG-PC-R
(303) 289-0277
FTS 330-1277
AV 556-2277
- o Alternate
Senior medical personnel on duty
(303) 289-0278

4.2.1.5 Security Personnel

The security personnel are responsible for the security at the spill site. Responsibilities include:

- o Assistance in the evacuation of personnel from the site.
- o Provision for traffic control points of appropriate locations in close proximity to the discharge in order to allow only authorized personnel and equipment to enter the discharge area.

The security representative and alternate are listed below:

- o Security Officer
William F. Dowell
Chief, Security Office
SARRM-SS
(303) 289-0367
FTS 330-1367
AV 556-2367
- o Alternative
Senior security officer on duty

4.2.1.6 Fire Prevention and Protection Representative

Rocky Mountain Arsenal maintains its own fire department, the Fire Prevention Branch of the Directorate of Installation Services. The fire department is located in Building 312 near the South Plant Area (see Figure 5). Fire prevention personnel have certain responsibilities which are important in preventing spills or hazards associated with tanks. All buildings, structures and facilities at RMA are inspected at weekly, monthly, quarterly or semi-annual intervals, in accordance with recommended frequencies and local requirements. Fire extinguishers are inspected on a monthly basis. Whenever deemed necessary, firefighters and apparatus are furnished to stand by during any welding, cutting or other hazardous operations, or loading/unloading processes. Firefighters inspect the site of any cutting and/or welding operation outside of established welding areas prior to issuing or closing a Hot Work permit. Spot inspections are frequently made during these operations to assure fire safety requirements are being observed.

Once an accidental spill has occurred, the Fire Prevention and Protection representative will inspect the spill site for any potential fire hazards which may be present. If a potential for a fire exists, preventive and corrective measures must be taken prior to the containment and cleanup procedures. If a fire is present at the spill site, proper types of equipment and chemicals must be used in containing the fire.

The Fire Prevention and Protection representative and alternate are listed below:

- o Fire Prevention and Protection Representative
Raymond A. Pimple
Chief, Fire Prevention Branch
SARRM-ISF-F
(303) 239-0192
FTS 330-1192
AV 556-2192

- o Alternative
Senior fire officer on duty
(303)289-0192 ext. 191

4.2.1.7 Supply Division

Upon notification of the accident/incident from the IOSC, the Supply Division representative will perform the following duties:

- o The Supply Division representative will man the warehouse located in Building 618, during non-duty hour. During regular duty hours, the day-to-day staffing will be utilized.
- o The required supplies and equipment necessary to cope with the emergency will be issued.

The Supply Division representative and alternate are Listed below:

- o Primary
John Grischkowsky
Manager of Supply Division
SARRM-ISN
(303) 289-0400
FTS 330-1400
AV 556-2400
- o Alternate
Horacio Medina
SARRM-ISN
(303) 289-0398
FTS 330-1398
AV 556-2398

4.2.1.8 Equipment Management Office

Upon notification of the accident/incident from the IOSC, the Equipment Management Office will perform the following duties:

- o Assure that the personnel of the Motor Maintenance Branch have been notified of the accident/incident location.

- o Suspend normal commercial transportation operations within accident/incident area.

The Equipment Management Office representative and alternate are listed below:

- o Primary
Robert Boykin
Manager of Equipment Management Office
SARRM-IST
(303) 289-0399
FTS 330-1399
AV 556-2399
- o Alternate
Waldemar Hass
SARRM-ISM
(303) 289-0286
FTS 330-1286
AV 556-2286

4.2.1.9 Motor Maintenance Branch

Upon notification of the accident/incident from the Equipment Management Office, the Motor Maintenance Branch will perform the following duties:

- o Assure that all branch personnel are notified of the accident/incident and its location.
- o Assure that all personnel responding from the motor pool area have the proper safety equipment.
- o Determine that all serviceable vehicles in the Motor Pool area, if any, are fueled and checked for dispatch to the accident/incident scene.
- o Determine the priority of requirements for the recapture of vehicles from regular user activities and notify such activities to have the vehicles immediately available, if required.

The Motor Maintenance Branch and alternate are listed below:

- o Primary
Waldemar Hass
SARRM-ISM
(303) 289-0286
FTS 330-1286
AV 556-2286
- o Alternate
Laurin Bengtson
SARRM-ISM-M
(303) 289-0287
FTS 330-1287
AV 556-2287

4.2.1.10 Personnel at the Site

Personnel at the site are responsible for the actual containment and cleanup of the discharge at each facility. Proper working knowledge of the equipment and safety regulations are essential for efficient and safe containment and cleanup operations.

4.2.2 IRT Alert and Mobilization

Security conducts patrols of the entire RMA installation during each shift (3 times a day). Each area is completely observed and under surveillance during the patrols. If an accidental spill is observed, the proper personnel are notified. Site personnel are also responsible for observing the working area and reporting any discharges. The following are the established notification procedures used for early detection of an oil or hazardous substance spill:

- o The site personnel supervisor or security patrol notifies the Facilities Engineer (IOSC) who then notifies the IRT members.
- o The Facilities Engineer notifies the observers to block any storm or sewer runoff drains to prevent spills from entering the systems.
- o The spill is identified (gasoline, diesel fuel, fuel oil, waste oil, caustic, methylphosphonic dichloride, insecticides or pesticides).

- o The spill size and composition are determined.
- o Fire Prevention personnel inspect the area to determine the cause of the spill (leakage of valves, rivets, seams and fittings, ruptured tank, loading/unloading spill or overflow).
- o The Fire Prevention personnel evaluate any potential dangers.
- o Security personnel secure the area around the site.
- o All personnel report their findings to the IOSC.
- o The IOSC coordinates the containment and cleanup operations.

4.3 SPILL CONTAINMENT AND CLEANUP PROCEDURES

The containment operations are performed by personnel from the tank facility involved, fire department, safety office and security office. The equipment and absorbent material described in Section 4.4 are available for use in containing and cleaning the spills. Once the spill is contained the Buildings, Grounds and Utilities Branch is notified to commence with the cleanup operations. The Buildings, Grounds and Utilities Branch is responsible for the actual cleanup operations with assistance provided by the fire department.

Specific containment operations discussed in this section pertain to the following types of spills:

- o Petroleum products
- o Caustic
- o Methylphosphonic dichloride
- o Pesticides and herbicides

4.3.1 Petroleum Product Spill Containment and Cleanup

The Fire Prevention Branch is responsible for the initial containment of any accidental spill which may occur. Once the spill is contained, the

Fire Prevention Branch assists Buildings, Grounds and Utilities Branch in the cleanup operations. Responsibilities of the Fire Prevention Branch include the following:

- o Standby in case of fire with aqueous film forming foam for petroleum fires.
- o Provide and use booms, rolls and pads of absorbent material for use in spill containment.
- o Provide sealants for use in sealing tank leaks.
- o Provide and use hand tools for use in diking and related control measures to limit discharge spread. Maintain direct communication with the Buildings, Grounds and Utilities Branch for use of heavy equipment and subsequent cleanup.
- o Conduct controlled burning after obtaining necessary concurrences when situation warrants.
- o Provide firefighting protection during recovery efforts and/or decontamination procedures.

The types of firefighting equipment at RMA are discussed in detail in Section 4.4.3.

The Buildings, Grounds and Utilities Branches responsibilities during cleanup operations include the following:

- o Collect all materials and any contaminated soil or substrate for proper disposal.
- o Label the contaminated materials.
- o Coordinate with fire department if controlled burning is warranted.
- o Provide assistance in the reclamation of the spill area.

4.3.2 Caustic Spill Containment and Cleanup

The Fire Prevention Branch is responsible for the initial containment of an accidental spill which may occur. The Fire Prevention Branch's responsibilities include the following:

- o Provide large quantities of water for the dilution of the caustic.
- o Provide sealants for use in sealing tank leaks.
- o Provide and use hand tools to dike and control discharge spread. Maintain direct communication with the Buildings, Grounds and Utilities Branch for use of heavy equipment in subsequent cleanup.
- o Provide firefighting protection during the recovery efforts.

Responsibilities of the Buildings, Grounds and Utilities Branch for cleanup are as described in Section 4.3.1.

4.3.3 Methylphosphonic Dichloride Spill Containment and Cleanup

The Fire Prevention Branch is responsible for the initial containment of an accidental spill. The Buildings, Grounds and Utilities Branch will provide appropriate protective clothing and conduct the cleanup. The following procedures are followed by the Fire Prevention Branch for the containment and cleanup operations for methylphosphonic dichloride:

- o Standby in case of fire with ABC (Phosphate Dry Chemical).
- o Provide and use vermiculite, diatomaceous earth, clay or fine sand followed by soda ash, slaked lime, limestone or sodium bicarbonate to contain any spills.
- o Provide sealants for use in sealing tank leaks.
- o Provide and use hand tools for diking and related control measures to limit spill spread. Maintain direct communication with the Buildings, Grounds and Utilities Branch for use of heavy equipment and subsequent cleanup.

- o Collect all the material and any contaminated soil or substrate and place in a fully contained drum with a high density polyethylene liner. Label the drums as hazardous and containing extremely corrosive material.

Responsibilities of the Buildings Grounds and Utilities Branch for cleanup are as described in Section 4.3.1.

4.3.4 Herbicide and Pesticide Spill Containment and Cleanup

The containment and cleanup operations are performed by Pest Control personnel from Building 543. An accidental spill in the storage and/or mixing rooms would be fully contained. Spill kits are strategically placed in the mixing and storage rooms. The kits are labeled and designated for use in handling herbicide or pesticide spills only. Table 1 presents a list of equipment that is found in the shop and vehicle spill kits. Spills at the loading/unloading area will also be treated with spill kits.

For some pesticides, chlorine bleach, caustic soda (lye, sodium hydroxide) or lime can be effectively used to decontaminate spills. Table 2 presents some examples of common pesticides and the decontamination procedures. Spills may be contained and washed down the sinks in Building 742. The sinks drain to a wastewater treatment tank. Prior to being discharged into the sewer lines, the contents from this tank are passed through a granulated activated carbon and an ion exchange systems. These two systems remove harmful constituents before the water is discharged to the sewage treatment plant. Massive spills of insecticides and herbicides will be reported to CHEMTREC Fort Mead Maryland (1-800-424-9300).

4.4 AVAILABLE EQUIPMENT

Sources of available equipment, vehicles and types of absorbent material to contain and cleanup an accidental spill at RMA are discussed in this

section. A variety of equipment is available for containment and cleanup operations. Absorbent materials (booms, pads, sheets, rolls and sand) are available to contain and remove minor discharges (1000 gallons) or less. Larger spills require the use of absorbents, earth moving equipment (graders, bulldozers, trucks, front end loaders) and/or pumps to remove excess amounts of oil from the spill site. The types of equipment listed below are discussed in detail in the following sections:

- o Absorbent material
- o Installed fire protection systems
- o Fire fighting equipment
- o Maintenance equipment
- o Additional resources

4.4.1 Absorbent Materials

Information on absorbent materials is required by 40 CFR § 112.7 (c)(1)(vii) and AR 200-1, 8-7 (b). The types and available absorbent materials present at RMA are listed below:

<u>Types</u>	<u>Size</u>	<u>Approximate Capacity</u>	<u>Use</u>
Sheets (polypropylene fibrous material)	18"x18"x3/16" (thickness)	100-200 gallons	Small spills, shallow water in a contained area
Sheets (polypropylene fibrous material)	18"x18"x3/8" (thickness)	100-200 gallons	As above
Sheets (polypropylene fibrous material)	36"x36"x3/8" (thickness)	200-400 gallons	As above
Rolls (polypropylene fibrous material)	36"x150"x3/8" (thickness)	200-1000 gallons	Over large flat areas
Boom (polypropylene fibrous material)	3" (diameter) x 10' (length)	100-200 gallons	Small spills in a contained structure

<u>Types</u>	<u>Size</u>	<u>Approximate Capacity</u>	<u>Use</u>
Boom (polypropylene fibrous material)	2-5" (diameter) x 10' (length)	100-200 gallons	As above

These absorbent materials are stored at the RMA Fire Prevention Branch and are readily available from the Motor Maintenance Branch if an accidental spill occurs.

Sand, sawdust or vermiculite can also be used as absorbent material to contain oil or some hazardous substance spills. These materials are readily available from the Motor Maintenance Branch if an accidental spill occurs.

4.4.2 Installed Fire Protection Systems

The following are the various types of fire protection systems at RMA (RMA, 1982c):

- o Water mains and fire hydrants.
- o Fire extinguishers (carbon dioxide).
- o Aqueous film forming foam (AFFF).
- o Alcohol-type concentrate (ATC).
- o ABC (phosphate dry chemical)

Each of the facilities discussed in Chapter 3, with the exception of Tanks 648A and B, has one of the above mentioned fire protection system. Table 2 presents the specific locations and the type of fire protection systems present.

Fire flow tests and hydrant maintenance are performed annually and after any major water main and/or hydrant repairs. Static pressures vary from

area to area throughout the installation. The following are approximate averages by area:

- o RMA Logistic Area: 85 psi
- o South Plant Area: 95 psi
- o North Plants Area: 105 psi

Potable water is supplied by the City of Denver through a 33-inch main for all needs on RMA. A one million gallon potable water reservoir (Building 372) with two 1,400 gallons per minute pumps are kept full for emergency use. Process water is supplied primarily from Lake Ladoga.

Fire extinguishers (primarily carbon dioxide and dry chemical types) are inspected monthly and given required servicing and maintenance in accordance with TMS-687 (U.S. Army Technical Manual) and National Fire Prevention Association (NFPA) Standard 10. Two and one-half and five pound dry chemical units are installed in or on all vehicles and mobile equipment. These are checked by the driver/operator and any deficiencies noted are reported to the fire department for immediate correction.

AFFF and ATC are used to extinguish any petroleum product fires. ABC powder (phosphate dry chemical) is used to extinguish and contain fires at the methylphosphonic dichloride tank facility.

4.4.3 Firefighting Equipment

The RMA Fire Prevention Branch is equipped with a variety of firefighting equipment. Fire Prevention Branch personnel and equipment respond to any fires that may occur at the site of an accidental spill. The following types of fire fighting equipment are available at RMA (RMA, 1982b):

- o Fire Pumps: — RMA has two fire pumps stationed at the fire station. Each is equipped with a water tank and a 55-60 gallon stainless steel tank filled with 3M Brand Alcohol-Type

Concentrate (ATC) or Aqueous Film Forming Foam (AFFF). Various types of firefighting equipment are present on each pumper. This equipment includes hydrant wrenches, spare nozzles, hose connections, shovels, 500-watt portable lights, hand tool kits, 20-pound dry chemical and 15-pound CO₂ fire extinguishers, pry bars, first and toxic aid kits, lock breakers, bolt cutters, pick headed axes, lifelines, mechanical resuscitators, self contained breathing apparatus and a variety of hazardous materials safety information.

- o Twin Agent/Equipment Truck — This truck contains 450 pounds of ABC (phosphate dry chemical) and 100 gallons of premixed AFFF. Other equipment located on this truck includes a breathing air cascade system for refilling breathing apparatus, generator, air chisel, cribbing material, protective masks, toxic aid and first aid kits, nomex-asbestos proximity suits including hoods and gloves, rescue power saw and 2-1/2 gallon ATC and AFFF fire extinguishers.
- o Tank Truck — The tank truck contains 2,200 gallons of water and is used as a natural cover and remote area structural firefighting apparatus.
- o Ambulance — An ambulance is available to transport any injured personnel to nearby hospitals. All essential items are carried, as well as a completely equipped trauma kit, toxic first aid kit and various sizes and types of pads and dressings.
- o Special Service Vehicle — The special service vehicle is used by the Fire Chief and is also equipped with supplies and equipment for use as a Field Command Post at a fire scene. Self contained breathing apparatus, mechanical resuscitator, hand tool kit and fire extinguishers are carried.

4.4.4 Maintenance Equipment

The Buildings, Grounds and Utilities Branch is responsible for repairing the failure, and coordinating inspections of the facilities with the Fire Prevention Branch to decrease the potential of accidental spills.

The types of available maintenance equipment available at RMA includes the following:

- o Bulldozers.
- o Dump trucks.
- o Graders and scrapers.
- o Front end loaders.
- o Pickup trucks.
- o Tank trucks and pumps.

4.4.5 Additional Resources

Equipment is available from agencies outside of RMA if the spill exceeds the response capabilities of RMA. Equipment is available from the following agencies:

- o Stapleton International Airport Crash/Fire/Rescue
- telephone - 398-2122
- o Denver Fire Department (Dispatch) - telephone -
575-3741
- o Brighton Fire Department - telephone - 911
- o South Adams County Fire Department - telephone -
911 or 288-0835
- o Denver Police Department - telephone - 911
- o Commerce City Police Department - telephone -
288-1535
- o Buckley Air National Guard Base
- o Installation Response Team at Fort Carson Army
Base
- o U.S. Army Reserves
- o Private Contractors

4.5 REPORTING PROCEDURES AND REVIEWS

If any release to the environment occurs, responsive actions will be taken to eliminate the source and contain the release. Remedial actions will be taken only after consulting with state and federal regulators. Personnel will report promptly any observed spill or release of hazardous and toxic substances to the IOSC. Any evidence of spill by discovery of a slick or sheen on water from oil, gasoline, fuel oil, diesel or other hazardous polluting substance will also be reported to the IOSC. Spill events and discharges will be reported immediately by telephone to the following offices:

- o EPA Regional Office (303)837-3895.
- o National Response Center, Washington, D.C.
(202)426-2675, (800)424-8802.
- o Command Channels at HQDA (DAEN-ZCE) AUTOVON 224-1163.

A written report will be prepared by the Environmental Office, IOSC within 60 days after the conclusion of a spill. The report will summarize the incident and include the following:

- o Description of cause and initial situation.
- o Organization of response action and resources committed.
- o Effectiveness of response and removal action.
- o Estimated costs of the incident.
- o Recommendations on:
 - Means to prevent recurrence.
 - Improvement of response actions.
 - Changes to the Installation Spill Contingency Plan (ISCP), if any.

The IOSC will maintain a record of all spills including the spill summary report for a period of 3 years.

A written report will be submitted to the EPA Regional Administrator after a single discharge of 1,000 gallons or more of oil or two spill events in a 12-month period as detailed in 40 CFR § 112.4. The information in the report will include the following:

- o Name of facility.
- o Name of owner/operator.
- o Location of facility.
- o Date and year of initial facility construction.
- o Maximum storage or handling capacity of the facility and normal daily throughput.
- o Description of the facility including maps.
- o A complete copy of the SPCC Plan with amendments.
- o Causes of the spill.
- o Corrective actions and/or countermeasures taken.
- o Additional preventive measures to minimize recurrence.

The EPA will determine the need for a written incident report for hazardous substance on an individual basis.

When a release of a hazardous substance into the environment occurs in amounts equal to or greater than the reportable quantity the National Response Center will be immediately notified as required by the Comprehensive Environmental Response Compensation and Liability Act of 1980. Except for the hazardous substances as detailed in 40 CFR § 117, one pound is the reportable quantity. Exceptions include releases solely into work places, vehicle and engine emissions, releases of radioactive material, fertilizer applications, and releases authorized by permits.

5.0 SECURITY PROCEDURES

5.1 INTRODUCTION AND OVERALL RMA SECURITY

Information on security at each of the facilities is required by 40 CFR § 112.7(e)(9)(i-v). The following security measures should be observed at each facility:

- o All of the facilities should be fully fenced with all drains, valves, starter controls and pumps locked in the closed position when not in operation.
- o Pipeline connections should be securely capped when not in service.
- o Facility lighting system should be adequate so that security patrols can discover spills at night.

The Security Office is responsible for the security system at RMA including fixed and mobile security police (guard) patrols, civilian guard system, visitor control, employee badge identification system and law enforcement. Staff includes 76 people.

The RMA is surrounded by a four-foot high four strand barbed wire fence. Signs, which are about 12 by 14 inches and read "U.S. PROPERTY, NO TRESPASSING", are posted every 500 feet along the fence. Additional signs, which are 4 by 6 feet and read "U.S. ARMY MILITARY RESERVATION, NO TRESPASSING", are posted about every 1,000 feet around the perimeter.

Entry at the two main entrances, the West Gate and the South Gate, is controlled by guard stations. The west gate is open 24 hours a day and the south gate as operations require. Both gates are manned by guards at all times when open. Personnel without authorized clearance must enter through the West Gate. Entrance procedures for personnel without authorized clearance require sign-in before temporary passes are granted. About 20 other gates are present around the perimeter. These

gates are kept locked and used only for emergencies. Guards also patrol the entire perimeter at least once during each eight-hour shift.

5.2 LOGISTIC AREA

No security fencing is associated with any of the specific tank facilities in the Logistic Area. No locks are present on the drains, and valves on the above ground Tank Farm 629A-D, 628A, 648A and 648B. Adequate lighting is present at Tank 632, CARM 10716 and the Security Service Station. Complete patrols of the area are conducted by the mobile security police during each shift at RMA (3 times per day). If an accidental spill occurred, the Installation On-Scene Coordinator (IOSC) would be notified immediately.

5.3 NORTH PLANT AREA

The North Plant Area is surrounded by two security fences. Access within the second is restricted to authorized personnel only and is strictly enforced. All of the tank facilities with the exception of Tank Farm 1505 are inside the perimeter of this second, locked security fencing. No locks exist on any of the drains, drain valves, valves, starter controls, or pumps. Lighting at all of the tanks is adequate. Complete patrols of the area are conducted by the mobile security police during every change of shift at RMA (3 times per day). If an accidental spill occurred, the IOSC would be notified immediately.

5.4 CONTAINER STORAGE AREA

No security fencing is associated with the mobile refueling station in this area. However, this area is within the restricted access portion of RMA. No unauthorized civilian vehicles or personnel are allowed on this part of RMA. No locks are present on the valves or drains. No lighting system is associated with this facility. Complete patrols are conducted by the mobile security police during every shift at RMA (3 times per day). If an accidental spill occurred, the IOSC would be notified immediately.

5.5 SOUTH PLANT AREA

The South Plant Area is surrounded by security fencing. No locks exist on any of the drains, drain valves, valves, starter controls and pumps at the tank facilities. Lighting at all of the tanks appears to be adequate.

Complete patrols are conducted by the mobile security police during every shift at RMA (3 times per day). If an accidental spill occurred the IOSC would be notified immediately.

6.0 PERSONNEL AND TRAINING

As of February 1983, 333 civilian and 16 military personnel were employed at RMA. Only some of these people are involved with operations that deal with oil and hazardous substances and spills. A brief description of the overall organization of the RMA staff is presented in the first section of this chapter. The second section includes descriptions of current training procedures.

6.1 PERSONNEL ORGANIZATION

Rocky Mountain Arsenal is part of the U.S. Army Armament Munitions and Chemical Command (AMCCOM). The organization chart for RMA is presented in Table 6. All of the RMA civilian staff are civil service employees.

The Directorate of Installation Services is the group primarily responsible for most of the oil and hazardous substance tanks included in the SPCC Plan.

The Directorate of Installation Services is responsible for maintaining the facilities at RMA including the procurement and dispersment of supplies, maintenance of buildings and equipment, and fire control. In particular, personnel of the Facilities Engineering Division are involved in the maintenance of the tank facilities and the containment and cleanup of oil and hazardous substance spills. This division is divided into several branches which are responsible for providing engineering, construction, maintenance, repair or alterations of equipment; buildings, roads, grounds and utilities at RMA.

The Fire Prevention Branch administers the fire prevention and protection program, responds to fire calls and chemical accidents, and provides emergency first aid. Service is provided on a 24-hour day, 7-day per week basis.

6.2 TRAINING PROCEDURES

Training is currently handled within each division at RMA with the exception of emergency response training which is installation-wide. Current training procedures have resulted in safe operation of RMA facilities.

Standard Operating Procedures (SOP) are developed for the various facilities and operations at RMA. SOPs include descriptions of the physical components of the system, technical program, maintenance procedures, preventive maintenance, contingency procedures, protective clothing, monitoring procedures, potential hazards and administrative procedures. Applicable SOPs serve as the references for personnel working at the tank facilities. U.S. Army Training Manuals are also developed and used for various standard procedures. As discussed in Chapter 3, TM5-678 (Repairs and Utilities, Petroleum, Oils and Lubricants) is the manual used for tank facilities.

Employees of the Fire Prevention Branch, who conduct spill cleanup activities, undergo extensive training. New employee fire prevention indoctrination (fire prevention lectures, demonstrations, drills and movies) are conducted on a biweekly basis whenever new employees are hired. Fire Prevention Branch training is based on an annual Master Training Schedule which establishes monthly training subjects and topics, and requires a minimum of four hours training each week for each firefighter exclusive of Chemical Accident and Incident Control procedures. International Fire Service Training Association (IFSTA) manuals, as well as applicable Army Field and Training Manuals, Army Technical Bulletins, NFPA material, and various other trade publications are used as text and reference material. Quarterly training schedules are prepared from the Master Schedule and reflect weekly training subjects, detailed text references, and instructors. Classroom instruction and outside drills are used to maintain maximum proficiency in all areas of firemanship including theory, tactics, and techniques. Training

schedules are flexible enough to allow changes to fit training requirements such as operation and maintenance of new equipment, fire critiques, change in procedures and regulations, etc. The Fire Prevention Branch is a member of the Tri-County Firemen's Association which makes their collection of films, slides and tapes available for all phases of firefighter training and plant employee education.

The firemanship training program represents 3019 man-hours of classroom, on the job, and off-post training (216 hours per firefighter, using an average strength of 14 firefighters) during an average year. Training is continuously evaluated to ascertain the effectiveness of the program, proficiency of instructors, and to determine the level of knowledge and competence of each individual. Firefighters are cross-trained in all duties and responsibilities pertaining to the Fire Prevention Branch which maintains maximum efficiency of operations within the fire department.

7.0 REPORTING PROCEDURES

Spills will be reported as discussed in Section 4.5. The SPCC Plan will be reviewed and amended as required when the following events occur:

- o A discharge of more than 1,000 gallons of oil into any navigable waters in a single spill,
- o Two oil spill events have occurred within any 12 month period.

RMA will also amend the SPCC Plan whenever a change in facility design, construction, operation, or maintenance materially affects the spill/discharge potential (40 CFR § 112.5). The amendment will be certified by a Registered Professional Engineer.

The SPCC Plan (including the ISC Plan) will be reviewed every three years to ensure compliance with the regulations and to include more effective prevention and control technology if applicable.

LIST OF REFERENCES

Academy of Health Sciences, 1983, "Pesticide Container Disposal Guidelines", Preventive Medicine Division.

Commonwealth, 1983, "Real Property Inventory" Volumes I-IV.

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Rocky Mountain Arsenal, 1982b, "Annual Resume", Directorate of Installation Services, Fire Prevention Branch.

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U.S. Army, no date, Department of the Army Technical Manual, TMS-687.

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U.S. EPA, 1981, Authorization to Discharge Under the National Pollutant Discharge Elimination System (NPDES), Permit Nos. CO-0030061 and CO-0021202.

IT CORPORATION

TABLES

DAILY INSPECTION CHECKLIST

[illegible]

TABLE 2
FIRE PROTECTION SYSTEMS

<u>Facility</u>	<u>Fire Protection System</u>
<u>LOGISTIC AREA</u>	
Tank 632	Fire hydrant
Tank CARM 10176	Fire hydrant
Tank Farm 629A-D and 628	Fire hydrant and CO ₂ fire extinguishers
Tanks 648A and B	None
Motor Pool Service Station	Fire hydrants and CO ₂ fire extinguishers
<u>NORTH PLANT AREA</u>	
Tank Farm 1403	Fire hydrants and CO ₂ fire extinguishers
Tank Farm 1402	Fire hydrant and CO ₂ fire extinguishers ⁽¹⁾
Tank Farm 1510	Fire hydrant
Tank Farm 1505	Water from emergency showers
Tank South of Building 1611	Fire extinguishers
Tank North of Building 1611	Fire extinguishers
<u>CONTAINER STORAGE AREA</u>	
Mobile Refueling Station	CO ₂ fire extinguisher
<u>SOUTH PLANT AREA</u>	
Tank Farm 745	Fire hydrants
Mobile Refueling Station	Fire hydrants
Tank Farm 321	Fire hydrants
Mobile Refueling Station	Fire hydrant and CO ₂ fire extinguisher
Building 742	Fire hydrant

(1) Do not use water for fire containment at the dichloro tank facility. Dichloro hydrolyzes with water producing acidic and corrosive products.

TABLE 3⁽¹⁾

EQUIPMENT LIST FOR SHOP AND VEHICLE PESTICIDE/HERBICIDE SPILL KITS

<u>SHOP KIT</u>	<u>VEHICLE KITS</u>
1 55-gallon open-head drum	1 instruction sheet
4 pairs of neoprene gloves	2 pairs of neoprene gloves
2 pairs of unvented goggles	1 pair of unvented goggles
2 respirators and pesticide cartridges	1 respirator and cartridge
2 aprons (chemical resistant)	1 pair of coveralls
2 pairs of rubber boots	1 dustpan
2 pairs of 100% cotton coveralls	1 shop brush
1 dustpan	10-30 pounds absorbent material
1 small dust brush	1 pint liquid detergent
1 square-point "D" handle shovel	1 apron
1 dozen polyethylene bags w/ties (heavy ply)	6 polyethylene bags w/ties (heavy ply)
1 18" pushbroom, synthetic fibers	1 portable eyewash
1 gallon liquid detergent	3 gallons household bleach
1 first aid kit	1 pair rubber boots
80 pounds absorbent material	blank labels
1 bung wrench	
1 drum spigot	
1 1 3/8" open-end wrench	
1 drum pump (manual)	
30 feet 1/2" polyethylene tubing or 1 25-foot garden hose	
1 2-1/2" bung	
1 3/4" bung	
1 first aid kit (standard)	
blank labels	

(1) From Academy of Health Sciences, 1983.

TABLE 4
COMMON PESTICIDES AND DECONTAMINANTS USED AT RMA⁽¹⁾

<u>USE LYE OR LIME FOR:</u>	<u>USE CHLORINE BLEACH FOR:</u>	<u>DO NOT USE ANY DECONTAMINATION CHEMICALS FOR:</u>
Atrazine	Calcium cyanamide	Alachlor
Propoxur	Calcium Cyanide	Chloramben
Captan	Chlorpyrifos	Chlordane and other
Carbaryl	Fonophos	Chlorinated hydrocarbons
Diazinon	Merphos	Diuron
Temephos	Lethane	2, 4-D
Naled		Maneb
2, 4, 5, -T		Methoxychlor
Malathion		Pentachlorophenol
Acephate		Picloram
Sodium Fluoride		Toxophene
TCA		Trifluralin
Rotenone		
Silvex		
Cyanazine		
Dalapon		
Dichlorvos		
Dimethoate		
EPN		

A guide for applying decontaminants is as follows:

<u>PERCENT ACTIVE INGREDIENT</u>	<u>AMOUNT OF DECONTAMINANT NEEDED</u>
1-10	Use an amount of decontaminant equal to the quantity of pesticide spilled.
11-79	Use an amount of decontaminant equal to 1.5 times the quantity of pesticide spilled.
80-100	The amount of decontaminant used should be equal to twice the quantity of spilled pesticide.

(1) From Academy of Health Sciences, 1983.

TABLE 5

IBT ORGANIZATION CHART

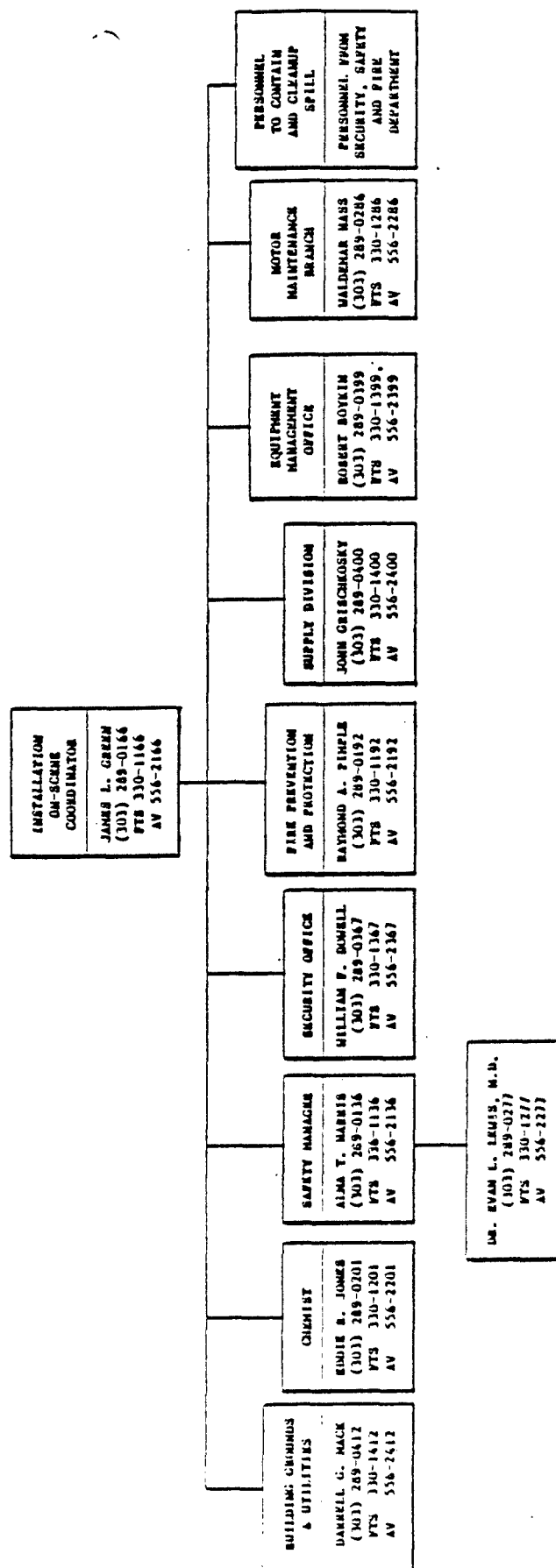
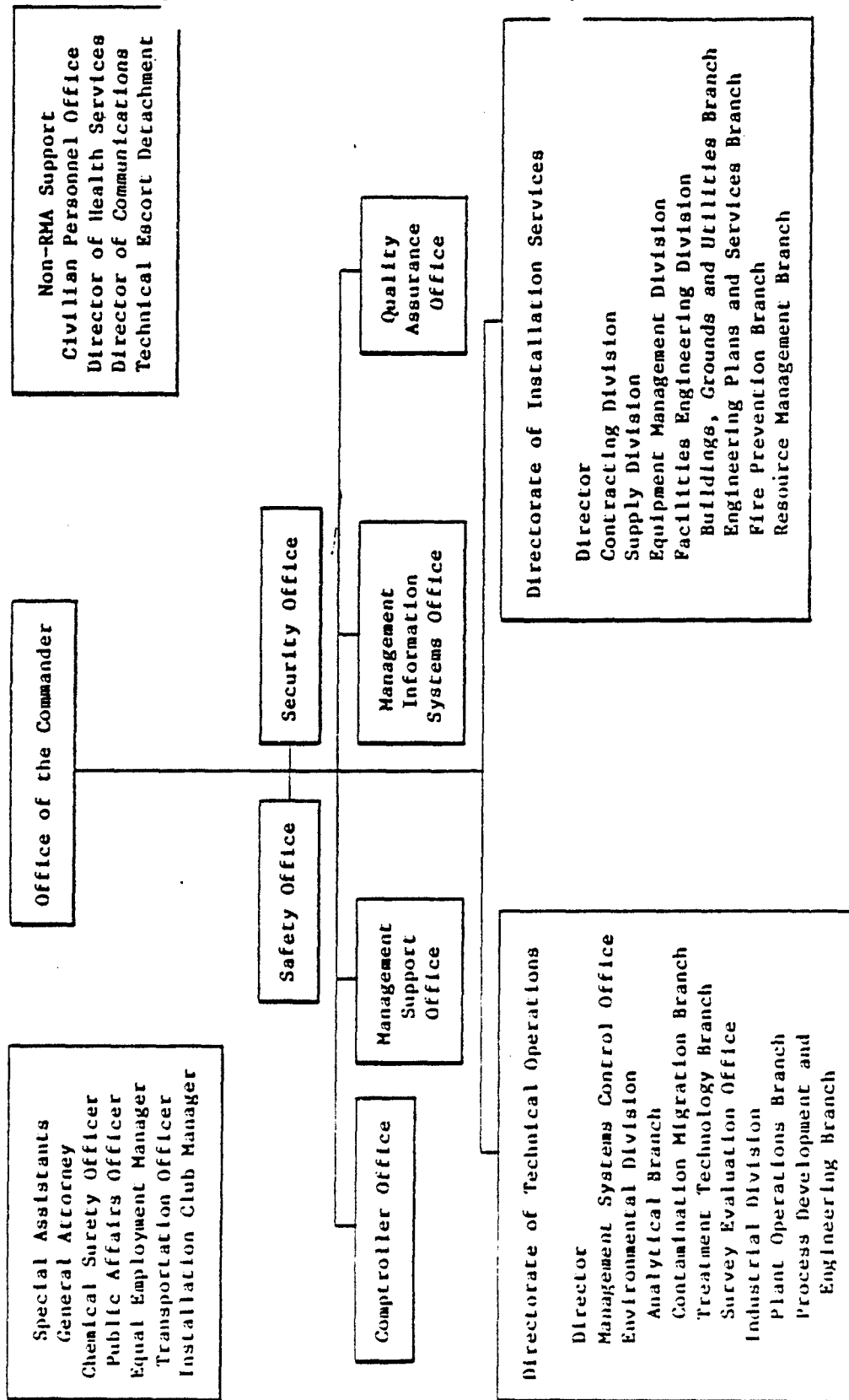


TABLE 6
ROCKY MOUNTAIN ARSENAL
ORGANIZATION CHART



IT CORPORATION

FIGURES

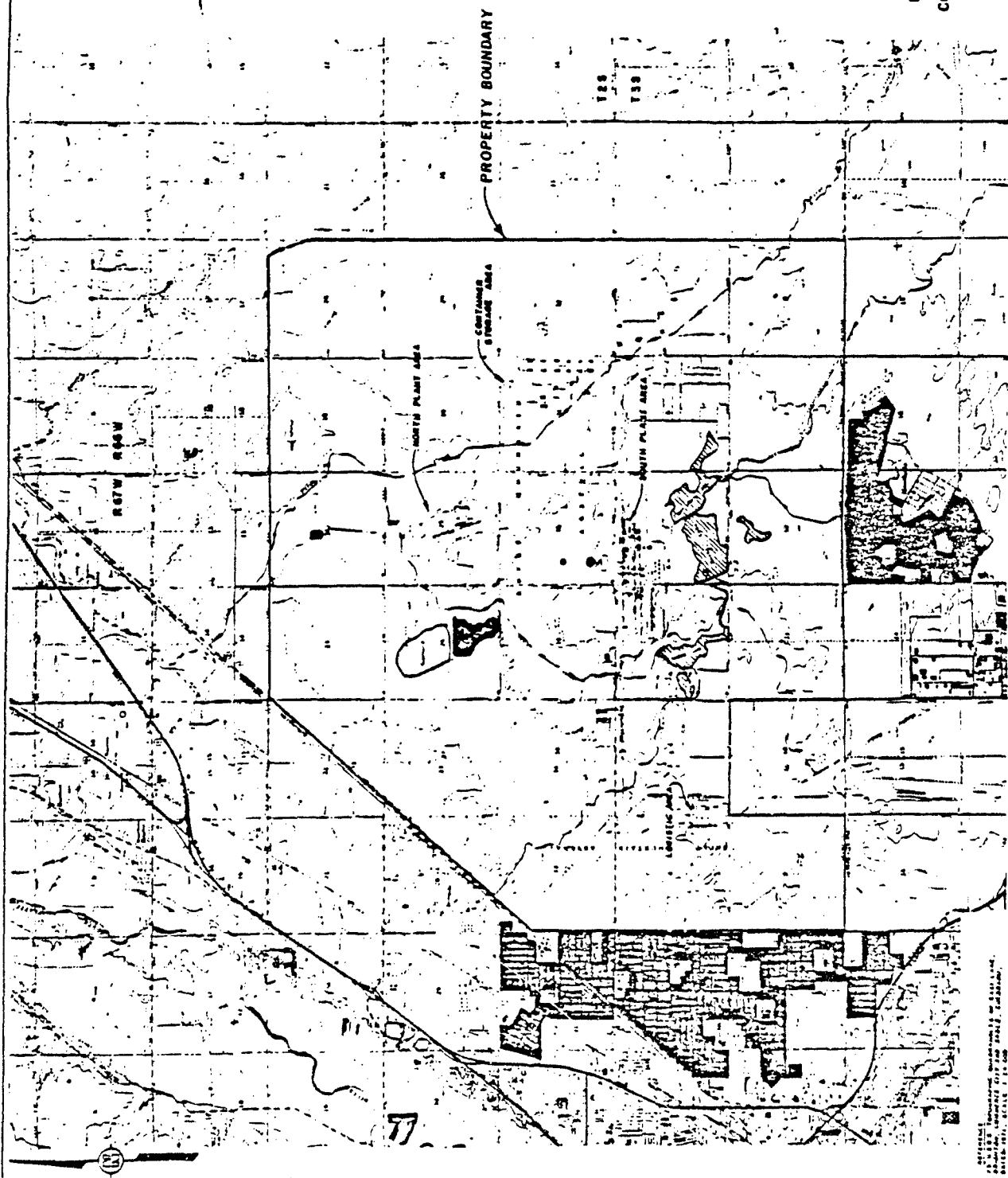


FIGURE 1

VICINITY MAP

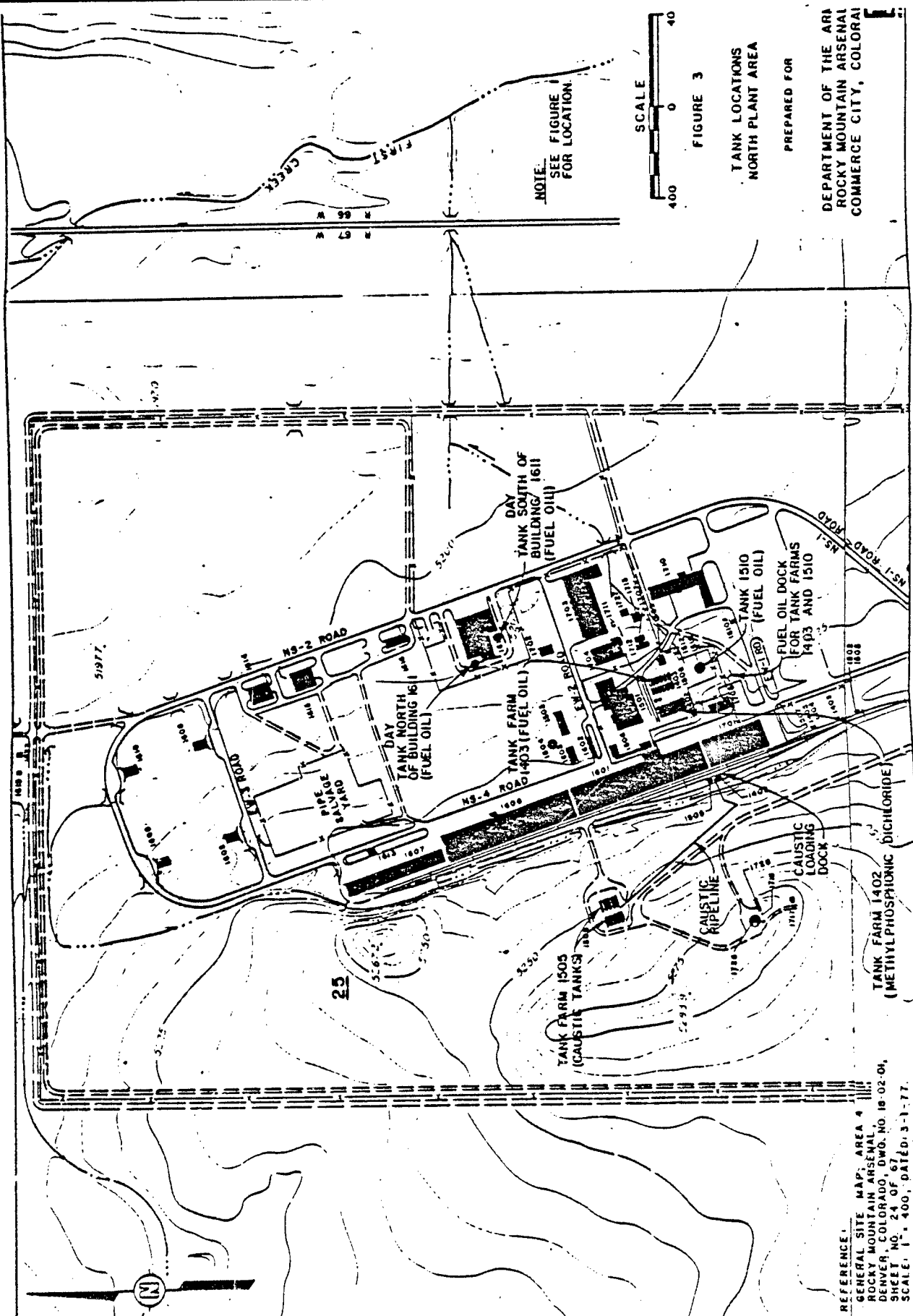
PREPARED FOR

DEPARTMENT OF THE ARMY
ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO



DRAWN BY	P. C. P.	CHECKED BY	7/16/82	DRAWING NUMBER	RM82-1981-E13
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DRAWN BY: J. J. F. CHECKED BY: J. J. F. APPROVED BY: J. J. F.
 DRAWING NUMBER: RM82-1961-B15



SCALE
 400 0 40

FIGURE 3

TANK LOCATIONS
 NORTH PLANT AREA

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 COMMERCE CITY, COLORADO

REFERENCE:
 GENERAL SITE MAP, AREA 4
 ROCKY MOUNTAIN ARSENAL
 DENVER, COLORADO, DWG. NO. 18-02-04,
 SHEET NO. 2 OF 5
 SCALE: 1" = 400', DATED 3-1-77.

